A report from Technical Forum meetings

Geant4 Workshop
November 8th, 2005

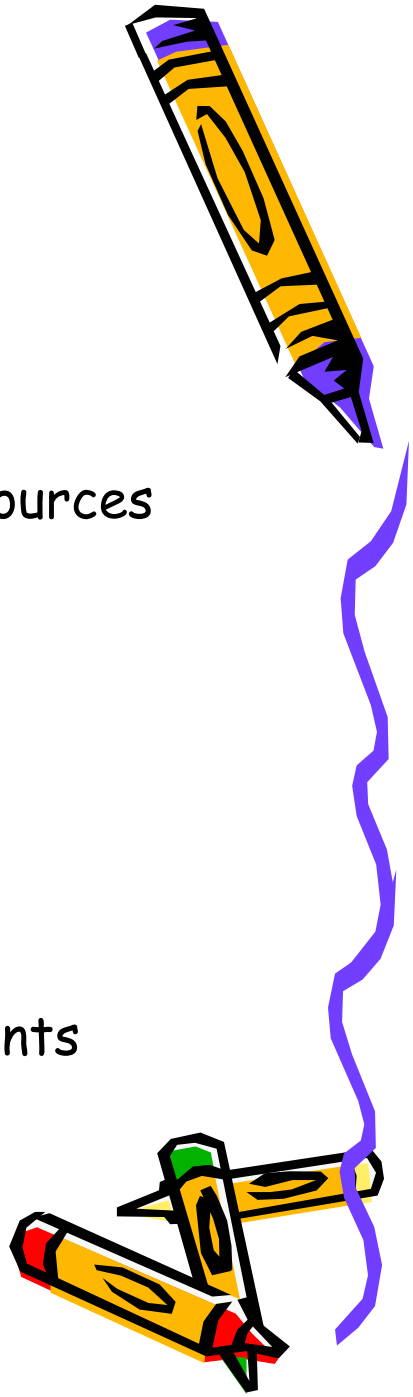
John Apostolakis (CERN)

Context

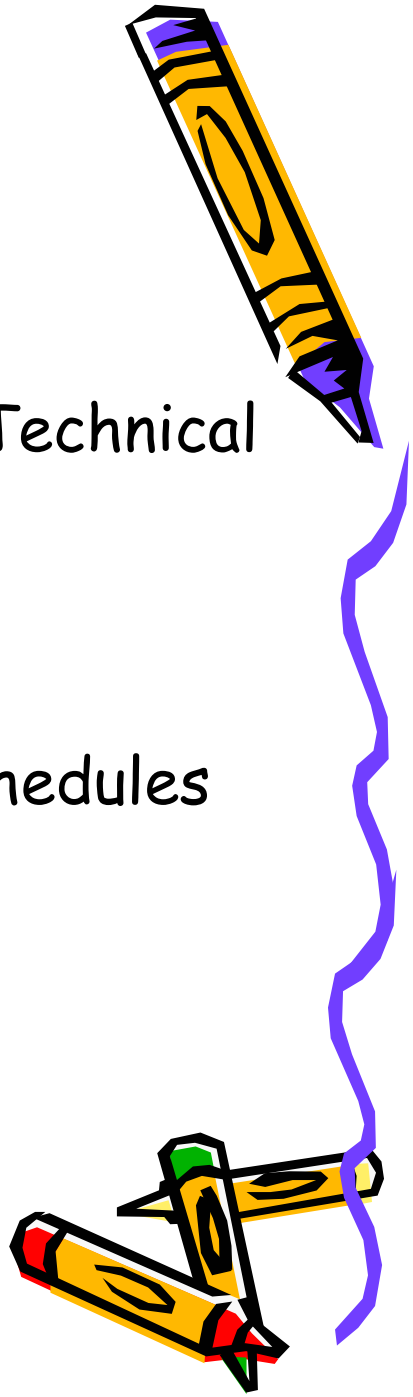
- Technical (User) Forum meetings: open to all
  - Started two years ago
  - Four meetings per year
- Already it is key mechanism for documenting, discusing and updating on progress with 'larger' requirements
- Will become the primary mechanisms for user interaction on larger requirements

Meeting goals and types

- Goal is to communicate, and
  - Discuss requirements that need significant resources
  - Identify issues that impact users
  - Consolidate requests for new platforms
  - Report progress in accepted requirements
- Meeting types
  - User meetings (dedicated final sessions)
  - Scheduled open meetings (via VRVS)
- Geant4 members responsible to capture requirements



Some links

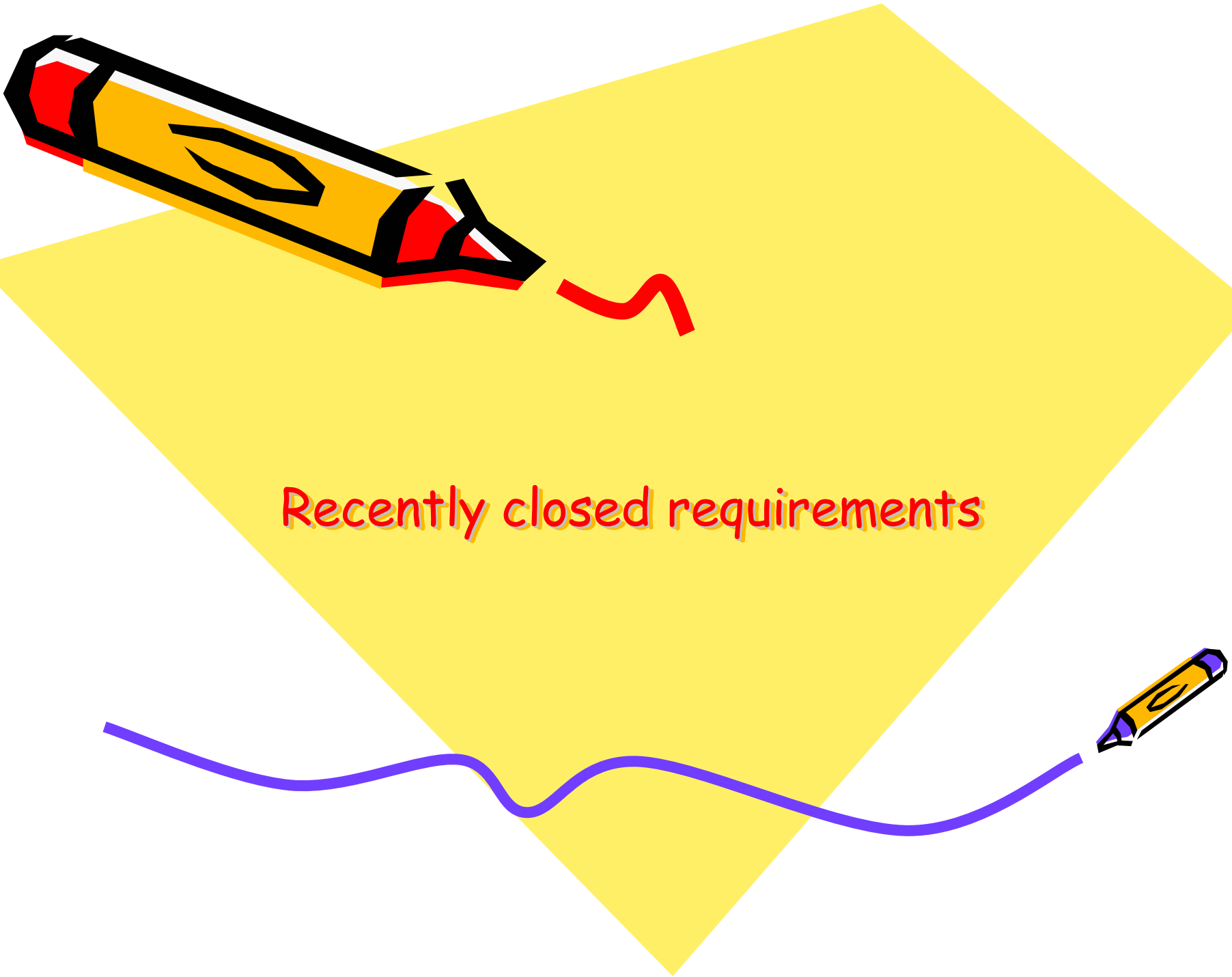


- Minutes and presented materials of former Technical Forums can be found at

  http://cern.ch/geant4/technical_forum/

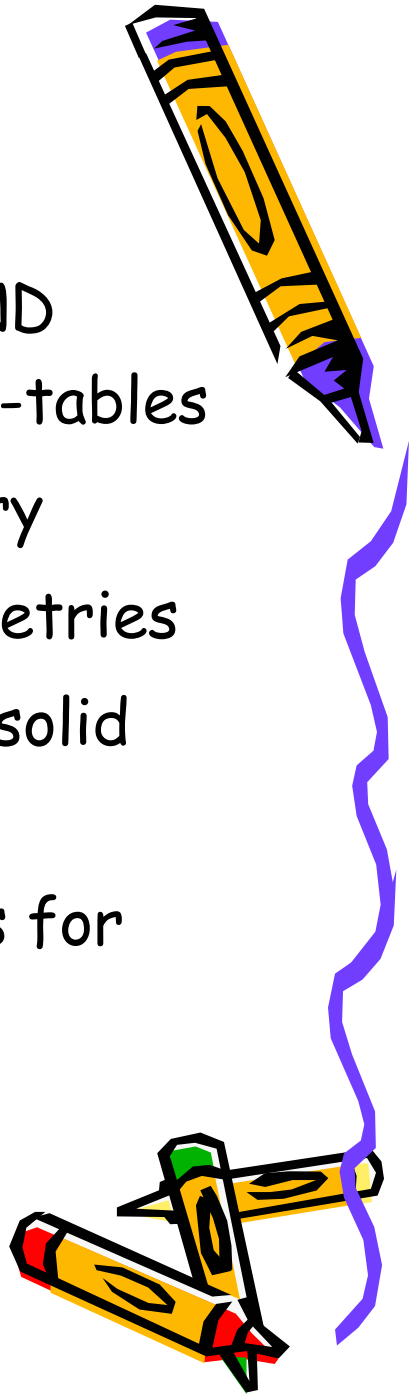
- Updated work plans and expected release schedules can be found at

  http://cern.ch/geant4/source/planned_features.html


Recently closed requirements

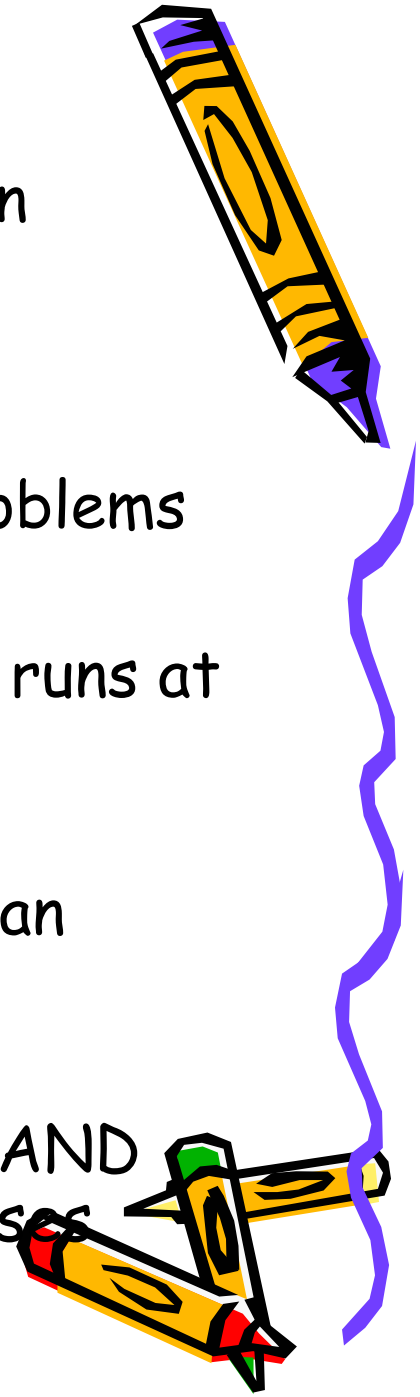
Requirements closed by G4 v7.0

- Req.0208 : Enhanced saving and restoring of selected processes' cross-section tables AND Req.0306: Storage retrieval of cuts/physics-tables
- Req.0304: Exchange format for the geometry
- Req.0307: Region settings in reflected geometries
- Req.0312: Possibility of customizing volume/solid creation step
- Req.0503: Possibility of adding new particles for searches of new physics

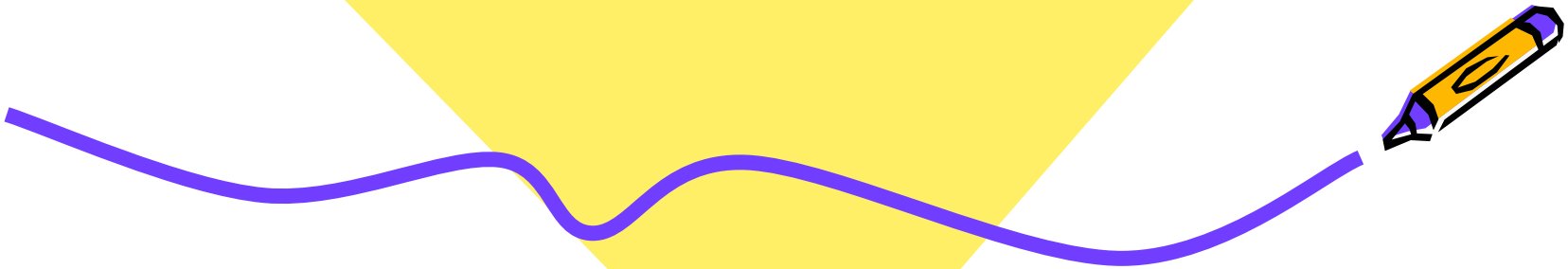


Recently-closed requirements

- Req.0201 : 'Killing' (relabelling) the primary in electron Bremsstrahlung
  - Feature released with G4 6.2
- Req.0301: Robustness of G4 and improved diagnostics to give more handles to solve problems
  - Features released with G4 6.1
- Req.0302: Reproducibility when resuming of runs at an event different from the first one
  - Fix has been made at G4 6.1
- Req.0305: Ability to release the memory of an Allocator 'stack' on request
  - Feature released with G4 6.2
- Req.0308: Creating a new daughter particle AND Req.0310: Consistent behavior across use cases
  - Feature released with G4 6.2



A selection of requirements
-longer term / under study

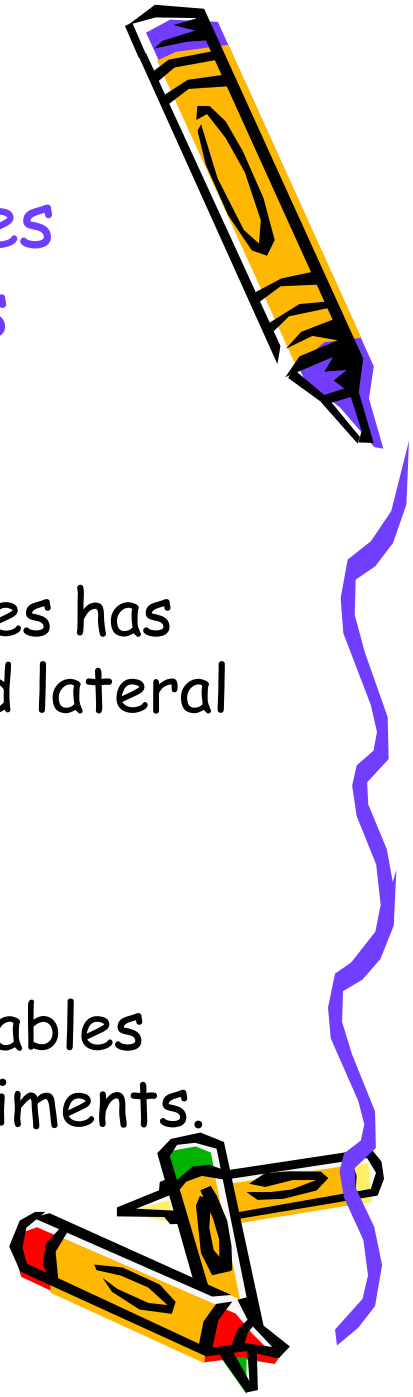


Req.0106 : Setup statistical test suites for most sensitive physics quantities

Responsible: J. Apostolakis, A. Ribon

Status:

- A first test suite for calorimetry quantities has been created. It measures longitudinal and lateral shower profiles for hadronics.
  - For several materials taken from LHC calorimeters.
- SLAC is continuously monitoring some variables most sensitive to BaBar and GLAST experiments.



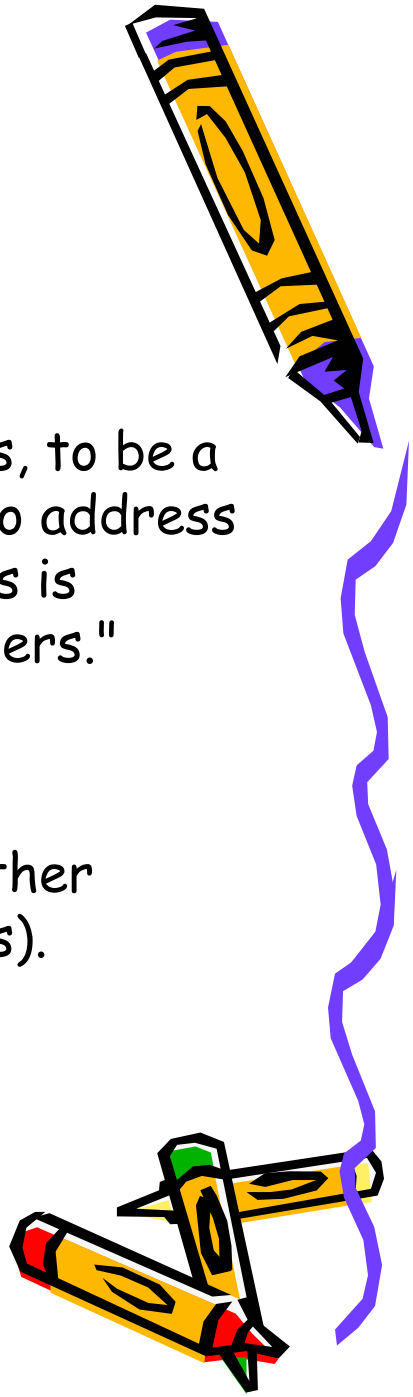
Req.0303: Performance of G4

Responsible: J. Apostolakis / G. Cosmo

Description: "Compared to G3 simulation, under similar circumstances G4 is reported by the LHC experiments, to be a factor 1.5-2 slower. A study group started last year to address this issue, and should continue with more priority. This is expected to be a collaboration between G4 and the users."

Status

- Simple setup benchmarking is part of release process
- Propose regular meetings to address this issue, and other continuing issues (eg identifying hard to find problems).



Req.0402: "Intuitive" documentation of the physics lists

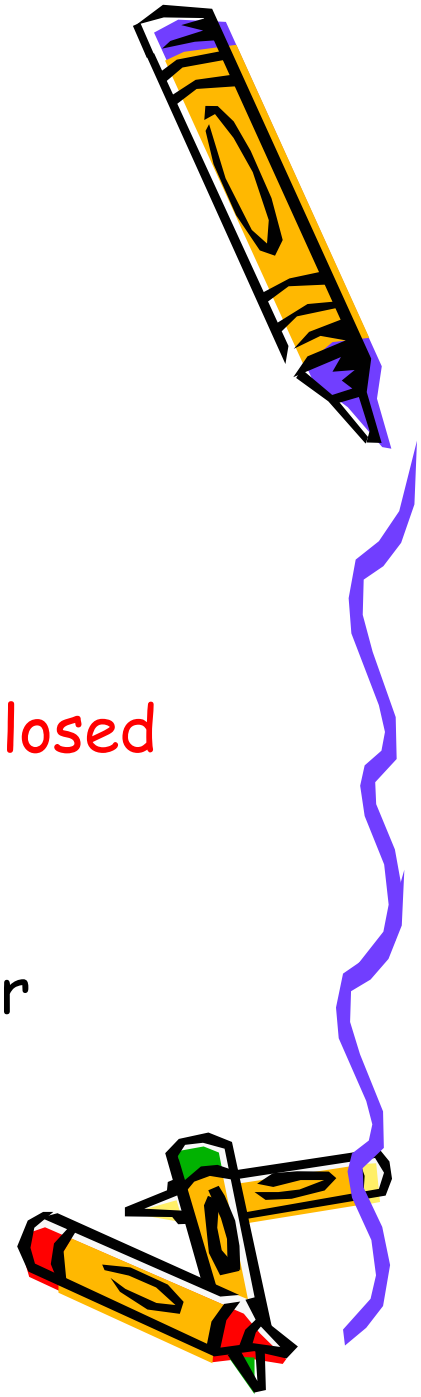
Responsible: M. Maire / M.G. Pia / H.-P. Wellisch

Requestor: ESA (G. Santin)

Description: "Intuitive documentation (maybe in graphical form) for each physics list to show, for a given particle, which model is active over which energy range. It could also be printed out by the list in ASCII format, with a loop over inserted models."

Hadronics: accepted, open.

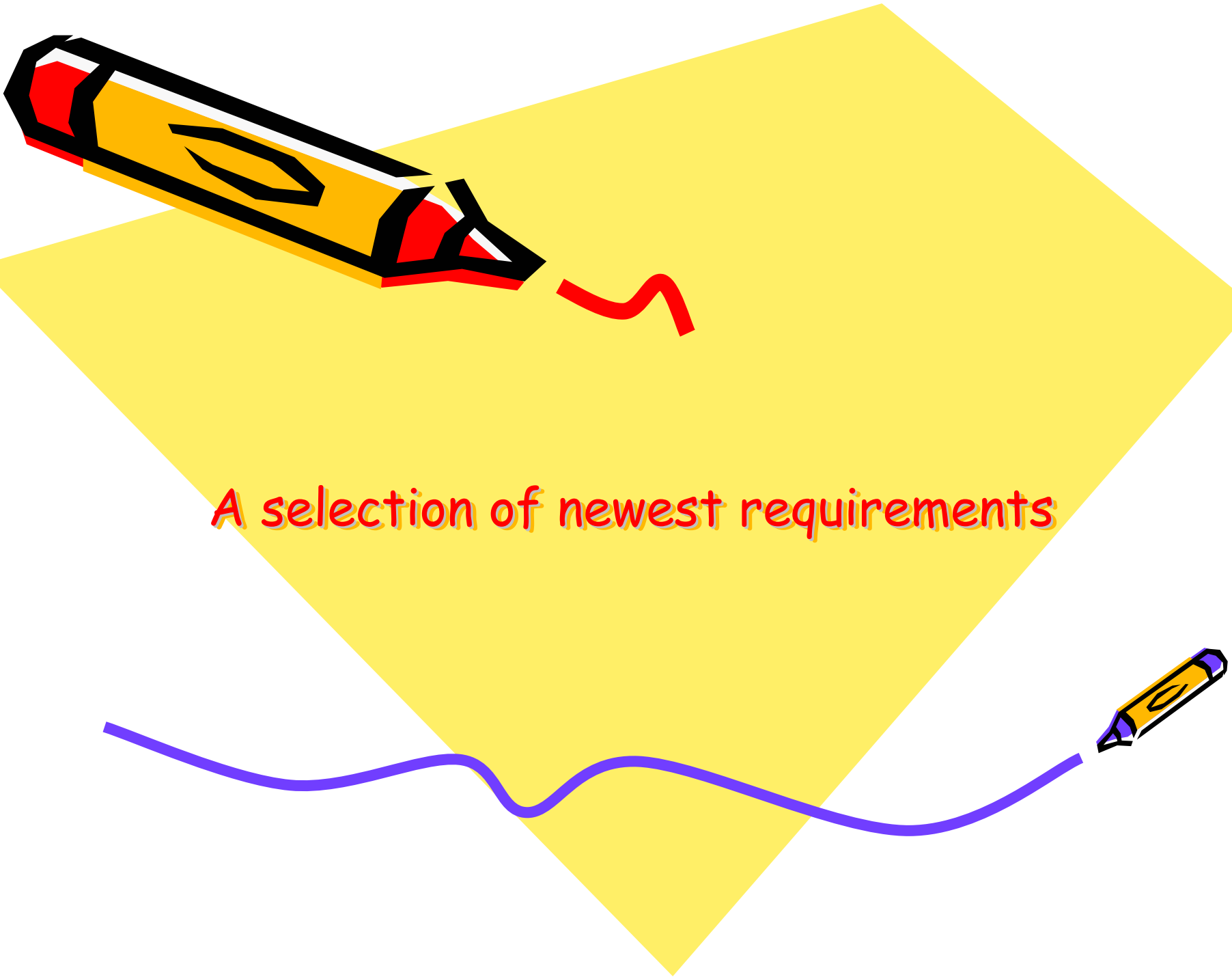
Req.0103 : Geometry construction - input from external models



Responsible: G. Cosmo

Two aspects of this 'multi-request' are under consideration

- GDML:
  - More comments on Req.0304.
  - GDML part of this requirement has been closed with Req.0304.
- CAD interface:
  - in the process of identifying objectives for
    - BREPs extensions and interface to CAD
    - We are discussing with NASA/GSFC and ESA for taking care of this.


A selection of newest requirements

704. Neutron data for additional elements

Originators: (BaBar, Vanderbilt)

Responsible: H.-P. Wellisch

- BaBar needs the elements Nd (Neodymium) and Sm (Samarium) added to the high precision neutron models.
- In addition Vanderbilt are asking that As, In, Ge, Ga, Sb, Hg, Cd, Te, and Gd also be added.

Seconded by ESA.

Status

- Most elements exist.
- Additional element (Hg) will be prepared.

Req.0604: Nested parameterizations

Originator: M. Asai (on behalf of medical users)

Responsible: J. Apostolakis

Access to a touchable from "Compute" methods in G4VPVParameterisation class

- Position, material, etc., could be parameterized with copy numbers of not only itself but its mother

Status:

Development is underway, issues of material 'counting' being addressed.

Restriction:

- Only material, sensitivity and vis-attributes can be parameterized using information from parent(s)
- Dimensions, position & shape (solid type) must be depend only on its own copy number – not parent or higher levels.
  - Necessary due to issue of voxelising logical volumes.

702. Selective verbosity

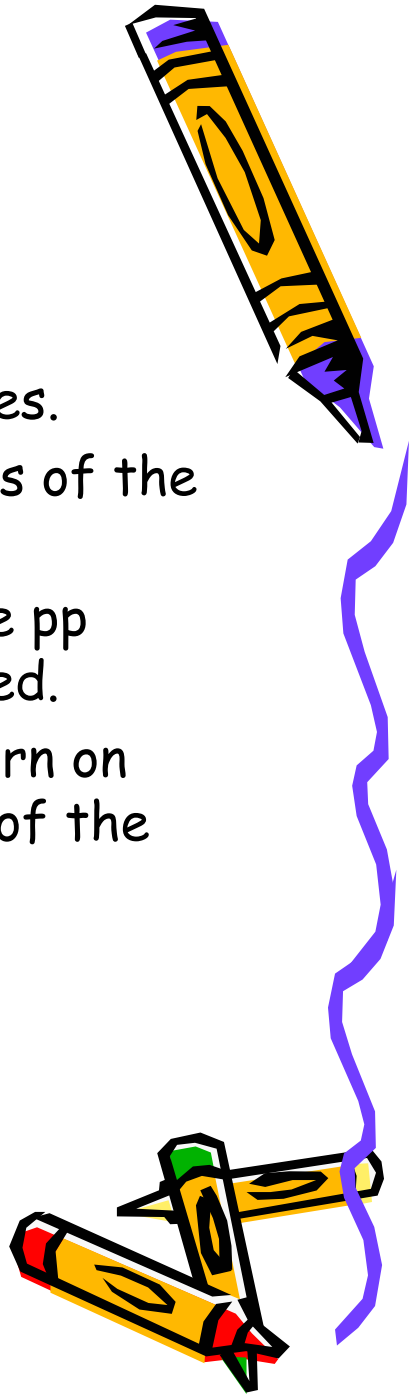
Originator: LHCb (G. Corti)

Responsible : T. Sasaki

- We would like more configurable debugging features.
  - It is possible to follow in details various aspects of the simulation by setting verbose levels.
  - This is very hard to use when tracking complete pp events because millions of G4Track are produced.
- It would be very useful to be able to selectively turn on such verbose for a single G4Track, a single region of the detector, a combination of the two.

Status

- Feature is certainly desirable for debugging
- Currently seen as a long-term need, not urgent.



703. Treat particles with dipole moments

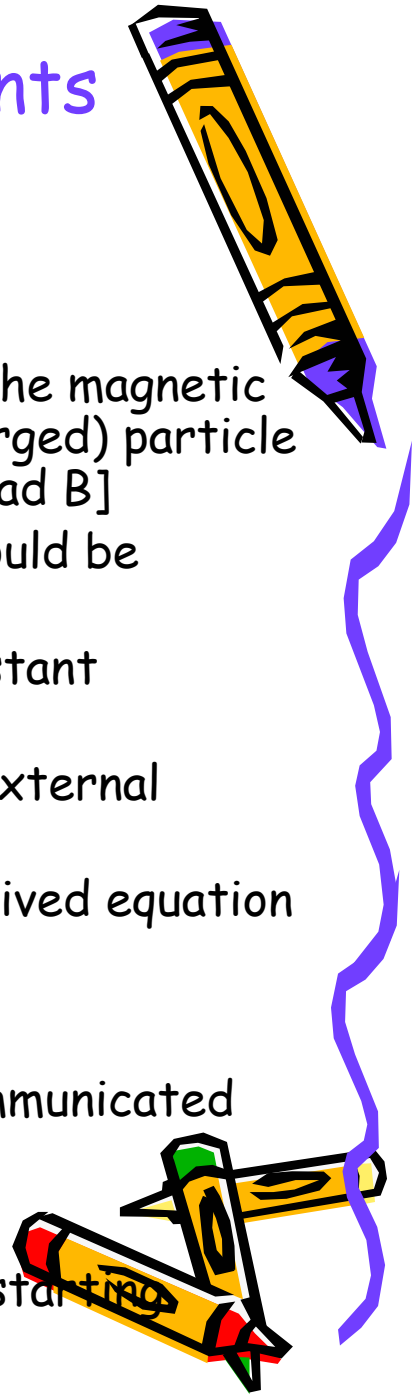
Originator: AD (Bertalan Juhasz)

Responsible: J. Apostolakis, H. Kurashige

- The user should be able to calculate the force acting on the magnetic (and possibly electric) dipole moment of a (neutral or charged) particle in an inhomogeneous magnetic (electric) field [F = mu * grad B]
  - for this, the magnetic dipole moment of a particle should be available for the equation of motion;
- Note: the magnetic moment is not always a vector of constant magnitude,
  - In magnitude and direction it can depend on e.g. the external magnetic field
- It should be possible to calculate the force by a user-derived equation of motion class

Comments/Status

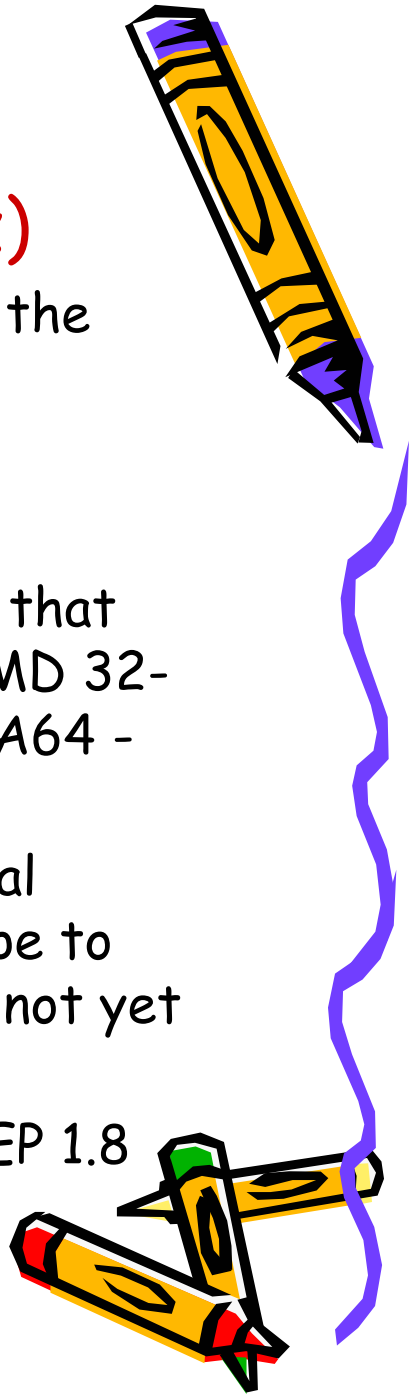
- A first working solution has been identified – is being communicated
  - using existing classes and a few user derived classes
- For a solution 'integrated' in the toolkit
  - first design study done; prototype implementation is starting



New proposed 'platforms': gcc 3.4.3

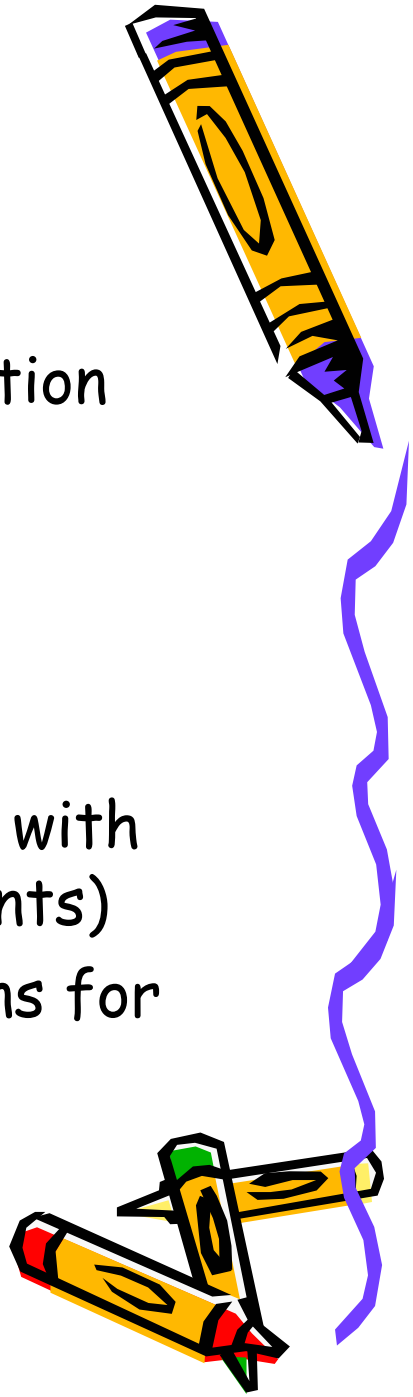
Originator: ATLAS (D. Quarrie, A. Nairz)

- ATLAS, and the other LCH experiments, intend for the next two supported platforms to be:
  - gcc 3.4.3 with SLC3 in 32-bit mode (IA32)
  - gcc 3.4.3 with SLC3 in 64-bit mode (AMD64)
- Current understanding (which should be checked) is that these will be binary compatible with both Intel & AMD 32-platforms and EM64T Intel 64-bit platforms (not IA64 - Itanium).
- The [requested] timescale is that porting of external software to IA32 is about to start [now] and we hope to have a prototype ATLAS port available in Sept, but not yet in production.
- Also interested to maintain compatibility with CLHEP 1.8 for approximately the next 3 months.
- To be discussed separately.



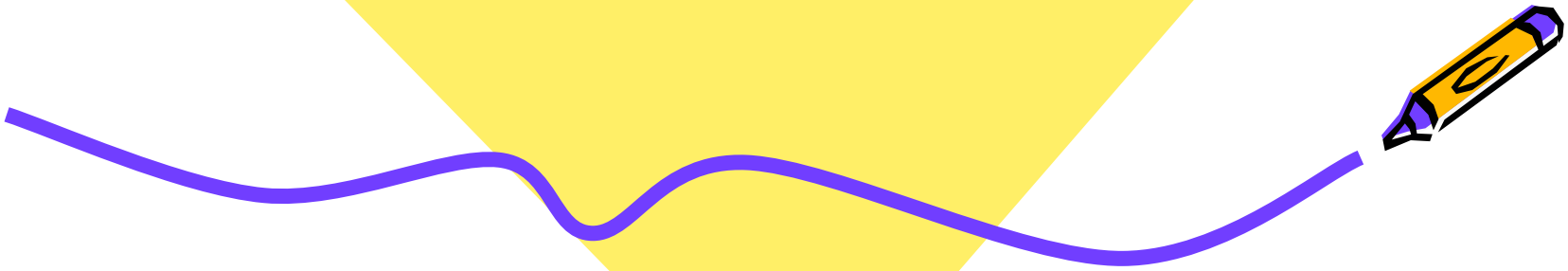
Outlook

- Technical Forum are key modes of interaction with users
  - Part of user meetings
  - Additional scheduled meetings
- The forum for major requirements
  - complimentary to direct communication with developers (best for smaller requirements)
- Input plays significant role in defining plans for future releases



END

http://cern.ch/geant4/technical_forum/



701. Polarised Rayleigh scattering

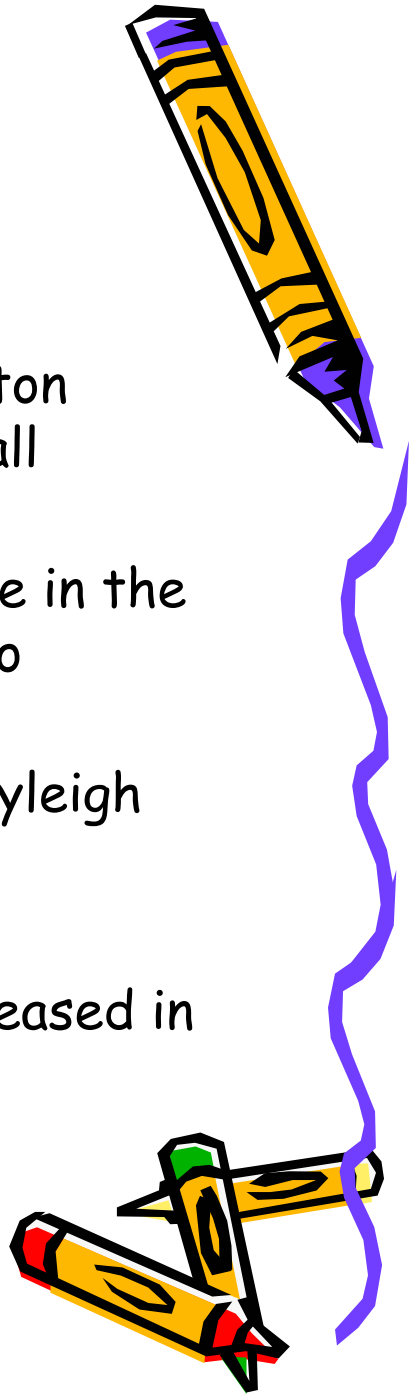
Originator: PoGO (Tsunefumi Mizuno)

Responsible : M.G. Pia

- Need Rayleigh scattering process that includes photon polarization, as neglecting it gives an artificially small modulation.
  - Rayleigh scattering cross-section is not negligible in the energy of our interest, this needs to be solved to simulate accurately.
- Request to implement the polarization process in Rayleigh Scattering

Status

- A LowEnergy Polarised Rayleigh process was released in Geant4 7.1 (June 2005).
- Feedback from users would be appreciated.



706. Example for new particles

Originator : Atlas/CMS

Responsible: J. Apostolakis, M. Asai

Example for creating new type of particles: creating a new particle and a modified primary transformer that creates tracks

Use case: creating new heavy sleptons particles, to investigate potential new physics in LHC experiment detectors.

- Requestors have their own working codes. Needs to understand they still request this or not.

707. Python UI

Originator : ATLAS (A. Dell'Acqua, A. Nairz)

Responsible: H. Yoshida

- More support for a python UI in G4 (not only the current UI/macro version).

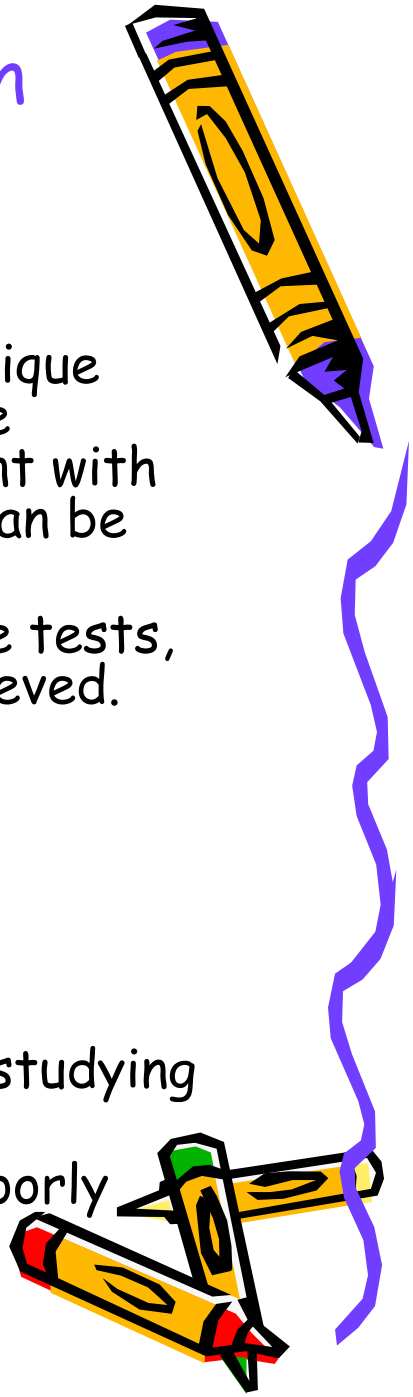
Req.0313: Particle properties from an external source

Responsible: M. Asai, H. Kurashige

Requestor: LHC

Description: "Request to study whether one can have a unique definition of the particle properties throughout all the physics models within G4 and preferably also consistent with the values used in generators. A candidate catalogue can be HepPDT, extracted from the PDG tables."

- Design study, preliminary implementation, performance tests, and assessment of potential effects on user code achieved.
  - Further studies continue during 2005.
    - Trade-off: gcc 2.95.X is not supported.
  - The first part has been worked out .
    - "non-static" particle definition
  - More work is needed for hadronics physics lists.
- Use for resonances is not now foreseen – would need studying
  - some physics models require particular values of mass/width for particular resonances (in general poorly measured).



Req.0403: Unique set of physics lists

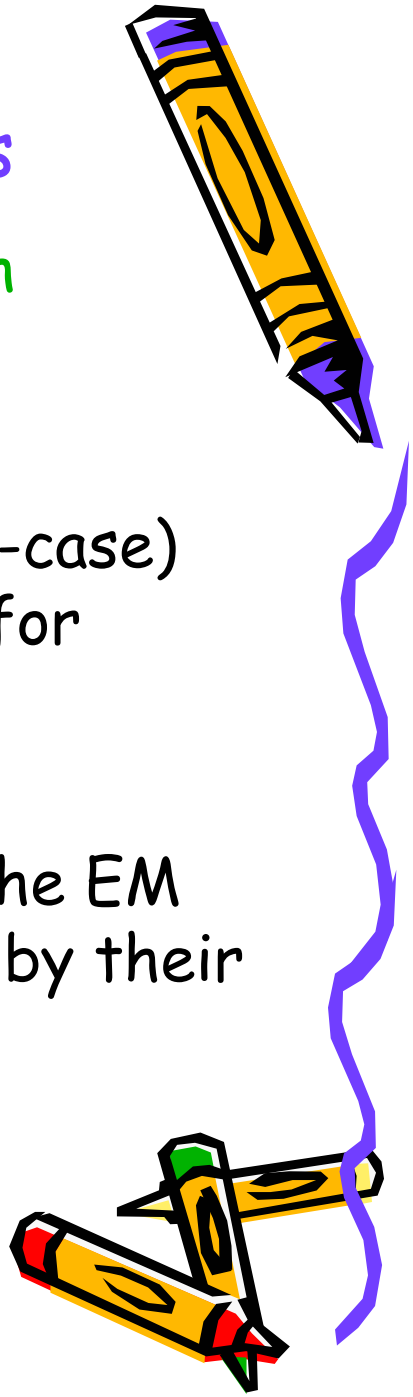
Responsible: M. Maire / M.G. Pia / H.-P. Wellisch

Requestor: ESA (G. Santin)

Description: "Unique set of physics lists (by use-case) and not two sets as now, one for EM and one for hadronics."

Status

Studying possibility to allow user to overwrite the EM physics constructor in a hadronic physics list by their choice of EM physics constructor.



Req.0501: Print-out of created processes should be optional

Responsible: M. Maire / M.G. Pia / J.P. Wellisch

Requestor: LHCb, Atlas

Description: "The list of created processes is printed out at the beginning. Though it is useful for development and verification, it should be able to switch-off for mass production run."

Status:

- Currently for standard EM, verbose level -1 stops print-out.

Req.0502: Treatment of particles that get stuck during simulation

Responsible: G. Cosmo, J. Apostolakis

Requestor: LHCb

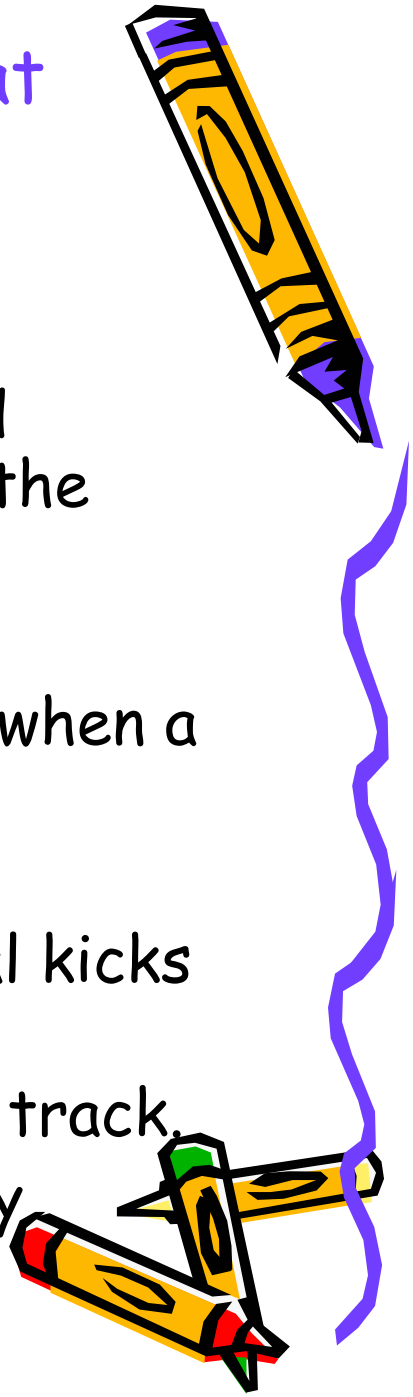
Description: "CMS drops a track if it stacks and continues the event. G4 by default abandons the event. Neither is good."

Status

As a first measure, Geant4 6.2 aborts an event when a particle is stuck.

Additional progress:

- In Geant4 7.0 a stuck track is given additional kicks and chances to continue
  - Trying to kill only most problematic 'stuck' track.
- To make additional effort to keep high energy particles (> 500 MeV)
  - See further discussion on Req.602.



Req.0505: Improvements in hadronics

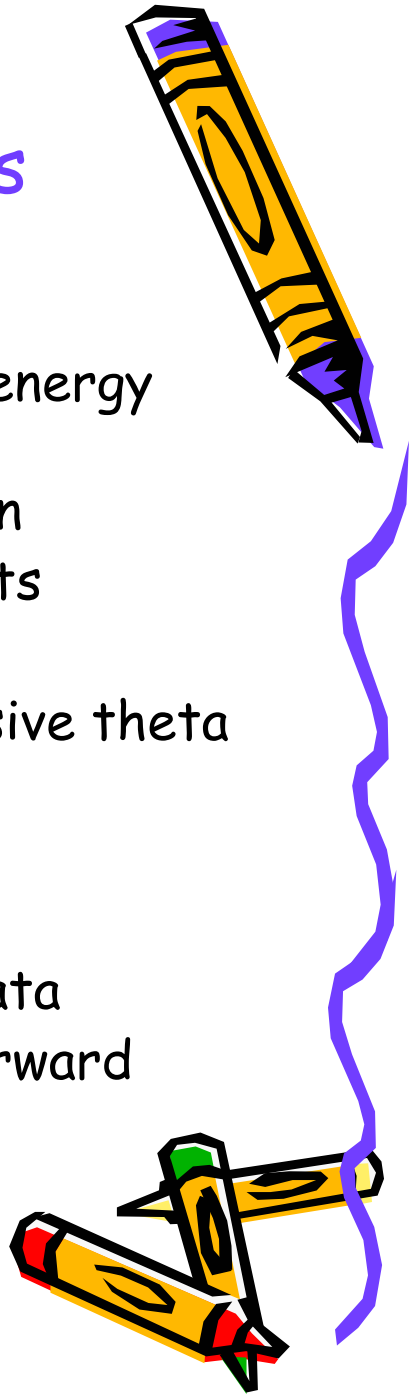
Responsible: H.-P. Wellicsh

Requestor: HARP

Description: "HARP needs following improvements in the energy range of 1-15 GeV."

- Bertini Cascade robustness to be used in production
- Binary Cascade extension to work with pion incidents
- CHIPS be available as alternative
- QGS model improvement to provide a smooth inclusive theta distribution in forward direction < 1 degree

- Patch 2 (of 6.2) included fix for a Bertini problem.
- Pion projectiles for Binary Cascade enabled in 6.0
  - Approach limited up to 1.5 GeV due to resonance data
- Improvements to QGS model theta distributions in forward direction (< 1 degree) underway.

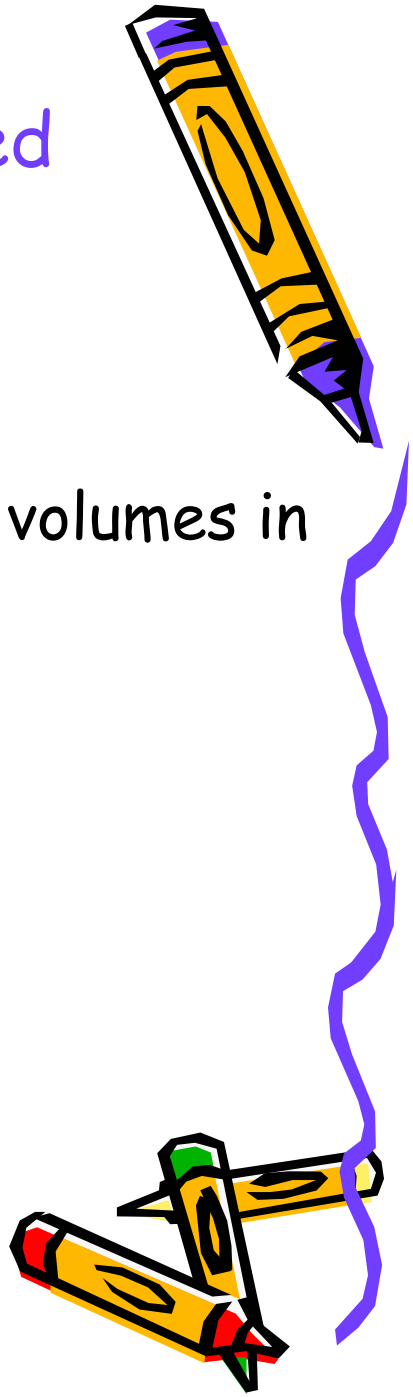


Req.0506: Optical photon transport with parameterized/replicated/divided volume

Responsible: P. Gumplinger

Requestor: TRIUMF (P. Gumplinger)

Revisions underway to enable use of 'replicated' volumes in optical processes.



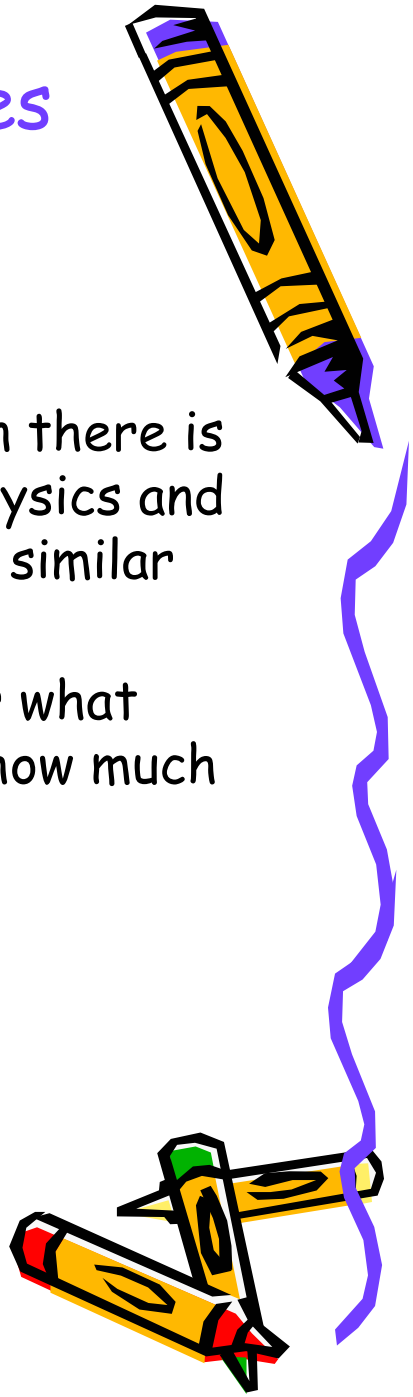
Req.0601: More details in error messages

Responsible: J. Apostolakis, M. Asai, G. Cosmo

Requestor: LHCb (G. Corti), seconded by CMS

- To help in debugging problems in the production environment we like to have detailed message when there is a problem. This already occurs for the hadronic physics and we have found it very useful. It would nice to have similar detailed message from the other parts of Geant4.

Discussion: Need more discussion with requestors for what kind of additional information could be added for how much of performance overhead.



Req.0602: Protect high energy particles from loop killing

Old title: Tracks killed by G4Transportation

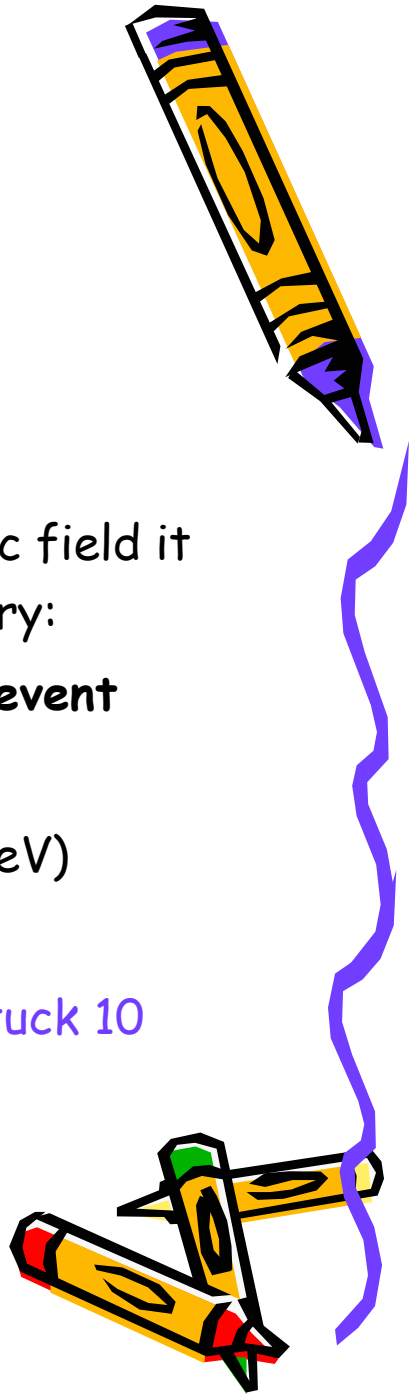
Originator: CMS: (P. Arce)

Responsible: J. Apostolakis

- G4Transportation kills a particle if during an step in magnetic field it has looped more than 1000 times without finding the boundary:
  - In CMS minbias events in CMS saw this **68.1 times per event**
    - Average energy lost is ~1 GeV / event
- Some tracks have E > 1 GeV (in 7K events highest was 13.7 GeV)

Status:

- Protection avoiding to kill particles above 100 MeV (unless stuck 10 times) added to Geant4 7.0
  - Need to be verified by experiments
- Resolution of underlying issues needs join study (starting).
  - Are they looping or stuck?



Req.0603: Option not to suspend tracks

Requirement from BaBar (D. Wright)

Responsibles: P. Gumplinger (Optical), H.P. Wellisch (hadronic)

- Currently few processes which suspend particles.
- For BaBar applications, it would be very useful not to suspend the particle (at least in the hadronic processes).
- Details:
  - Processes involved are G4Cerenkov, G4Scintillation, G4FastSimulationManagerProcess, G4HadronicProcess
    - For G4HadronicProcess, only one hadronic model (G4NeutronHPElastic) invokes the suspension.

Discussion: An option adding a switch to a suspending process that enables the user to turn off/on the suspension of the particle could be a solution.

Status:

- G4Cerenkov, G4Scintillation and G4FastSimulationManagerProcess has already had such switches.

Req.0605: Adding touchable to secondaries

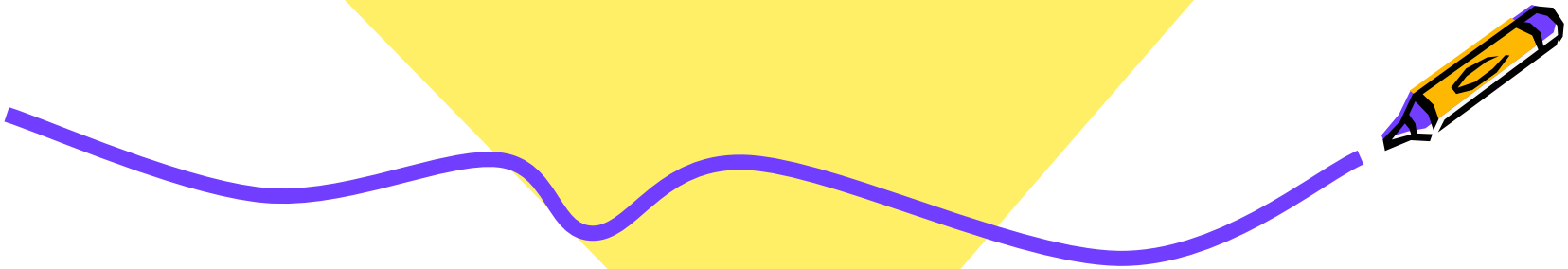
Responsible: H.P. Wellisch, T. Sasaki

- Touchable should be always attached for all secondaries
  - Currently, only EM processes set it.

Status

- At 7.0, hadronics also adds touchables.
- Need to confirm for other processes, e.g. optical photon, decay products.
  - Potentially can relieve individual physics processes, by doing it in kernel
    - Under consideration.

Longer term requirements
- Under development
- Under study

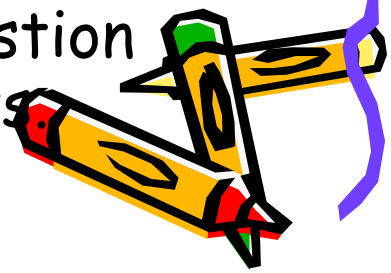


Req.0309: Provide documentation on the technical aspects of all available physics processes

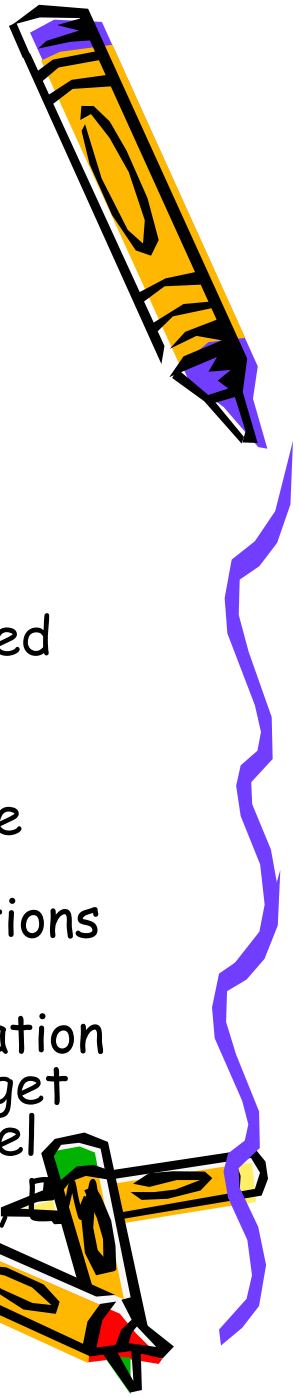
Responsible: M. Maire / M.G. Pia / H.-P. Wellisch

Description: "All available physics processes, models, cross-sections, etc., should provide documentation of the technical aspects of the implementation: details of the expected behavior of a model should be provided (for example how incoming and outgoing particles are handled). This applies to both hadronic and electromagnetic processes."

- Concrete requirement for behavior of secondaries of hadronic process was fulfilled (Req.??).
- Physics group coordinators are open to suggestion of concrete issues and potential improvements



Req.0401: Extension of Ion hadronics interaction to cover a good part of the cosmic ray range in (A,Z) and energy

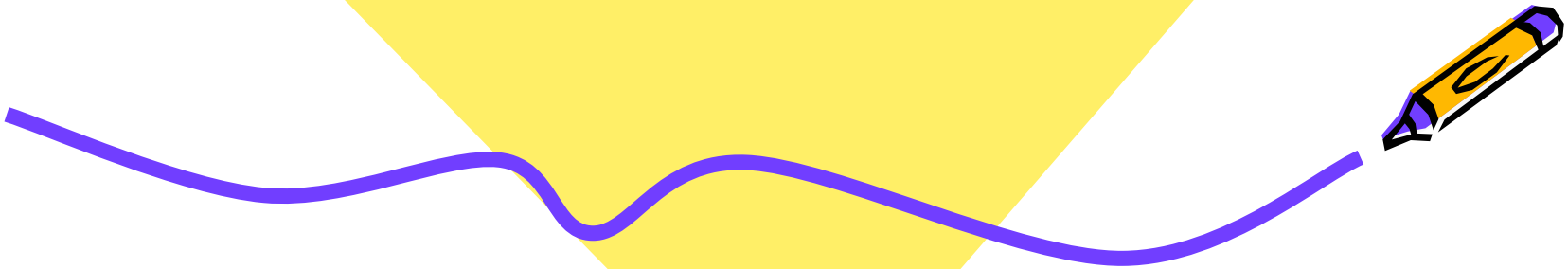


Responsible: H.-P. Wellisch

Requestor: ESA (G. Santin)

- EM dissociation: Released in G4 6.2
- Inelastic reactions
  - Below 10 GeV per nucleon: Released Xsec in 6.0, extended models in 6.1 for light ions (<= C)
  - Above 10GeV/nucleon
    - Evaluated existing Xsec parameterisations – they are now good to about 20%. Extended QGSM to predict these Xsec and made a systematics of these predictions at O(1%) level.
    - Prototype extension of QGSM for final state generation in central rapidity for all ions and projectile and target fragmentation based on exciton pre-equilibrium model.
  - Work to be done: radioactive decay for relativistic ions, EM dissociation for higher excitations than quadropole resonance.

Requirements closed by
September 2005



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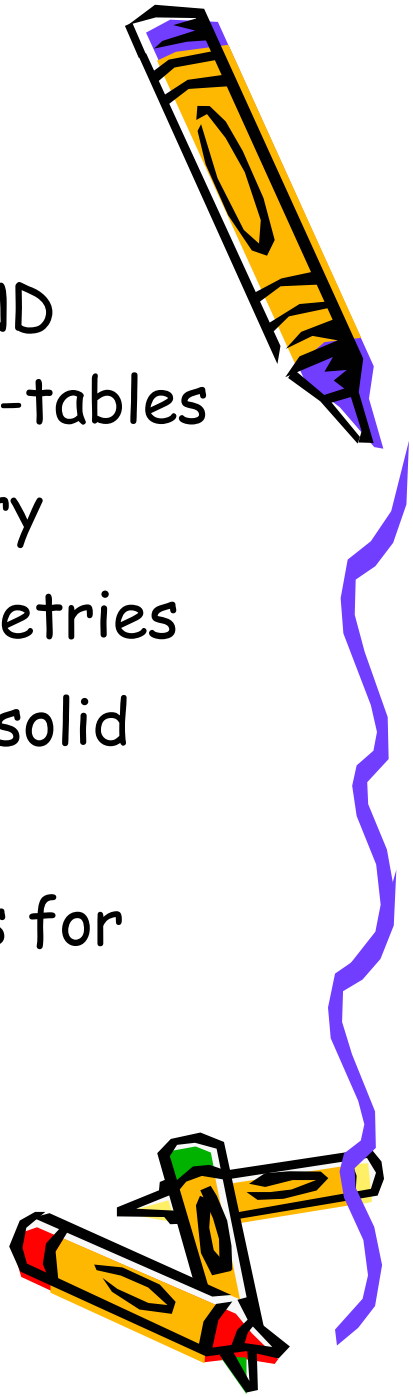
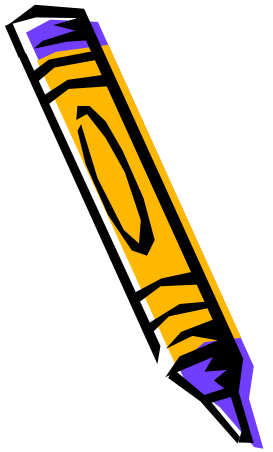


Req.0311: Parameters used in physics list should be well document and under user control



Responsible: H.-P. Wellisch

Description: "When the behavior of a specific physics list depends on parameters (for example on a momentum threshold) this should be clearly documented, specifying if such parameters are fixed or under user control."

- Note (from discussion): Major user modifications, such as these, would reduce the value of comparisons of the same physics list between users and experiments.
  - Physics list is free of user-tunable parameters except production thresholds.
- To be closed.

Closed

Req.0504: Geant4 release should be tested by Valgrind

Responsible: G. Cosmo, S. Sadilov

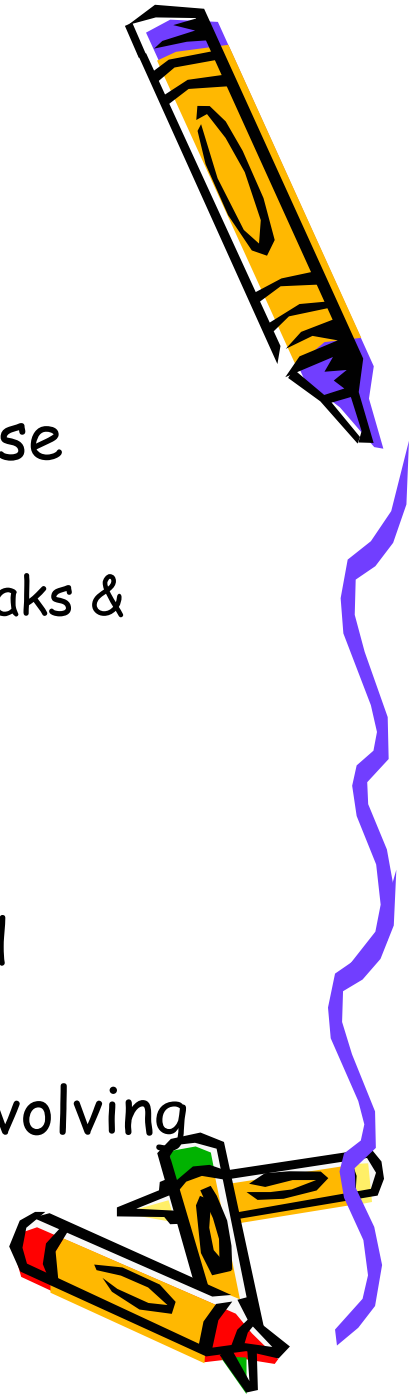
Requestor: LHCb

- Usage of Valgrind has been part of the release procedure since over two years
  - previously Insure++ was used for memory leaks & runtime error reports.
  - Selected system tests are checked.

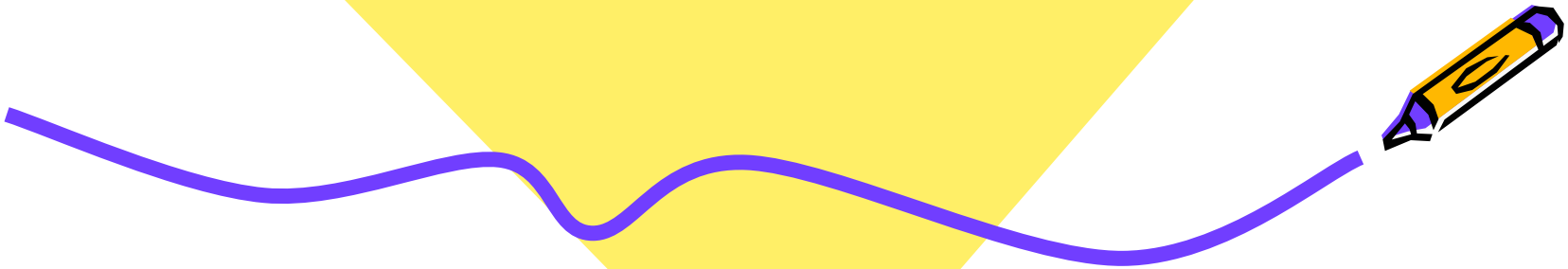
Problems are reported to developers.

- Developers are requested to fix the reported problems
  - in particular those reported by Valgrind involving errors at runtime.
- To be closed.

Closed

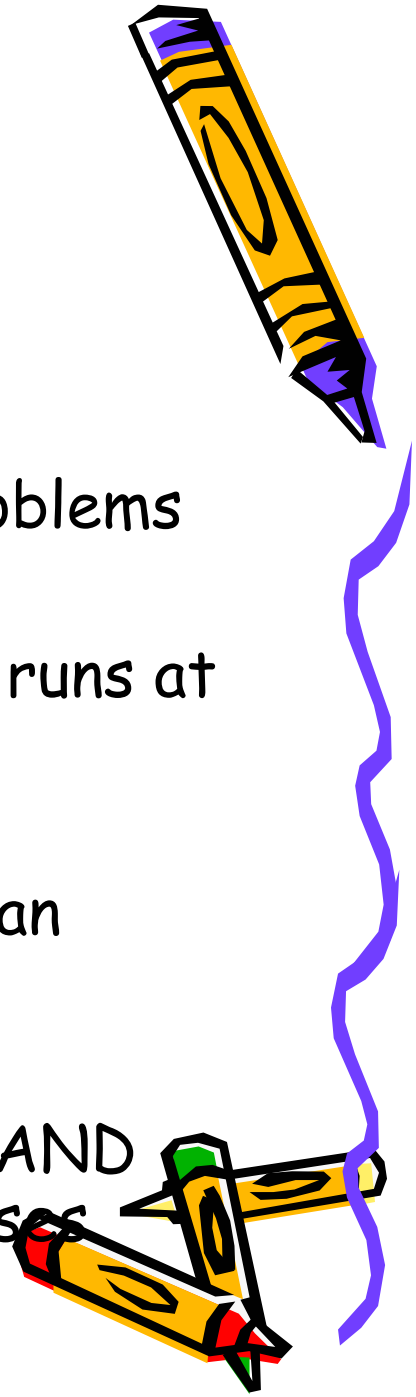


Requirements closed by
March 2005



Recently-closed requirements

- Req.0201 : Killing the primary in (electron) Bremsstrahlung
  - Feature released with G4 6.2
- Req.0301: Robustness of G4 and improved diagnostics to give more handles to solve problems
  - Feature released with G4 6.1
- Req.0302: Reproducibility when resuming of runs at an event different from the first one
  - Fix has been made at G4 6.1
- Req.0305: Ability to release the memory of an Allocator 'stack' on request
  - Feature released with G4 6.2
- Req.0308: Creating a new daughter particle AND Req.0310: Consistent behavior across use cases
  - Feature released with G4 6.2

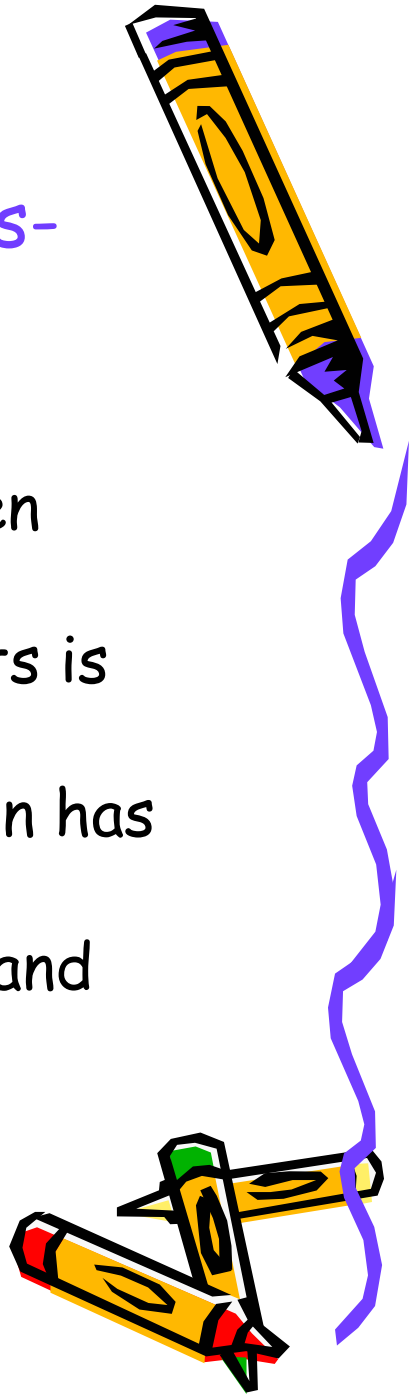


Req.0208 : Enhanced saving and restoring of selected processes' cross-section tables

Responsible: M. Asai, H. Kurashige

- Some enhanced verbosities have already been released with Geant4 6.0 and 6.1.
  - Reshuffling of the order of materials/cuts is included in 6.1.
- Design study and some partial implementation has been done.
  - Picking up some usable tables from a file and calculate only unavailable tables.
  - Work is in progress and expect to be released at 7.0.
- Requirement to be closed.

Closed



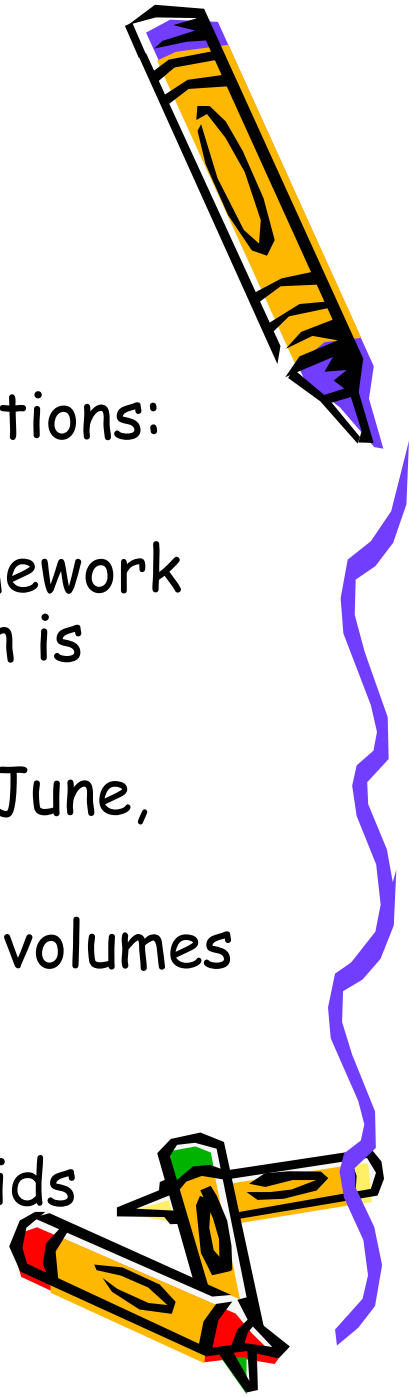
Req.0304: Exchange format for the geometry

Responsible: G. Cosmo

Description: Enable use of an external file for exchanging geometry description. Potential options: GDML, DDD, other (?).

- The solution G4 proposes is GDML in the framework of the LCG project. The GDML implementation is already partially done (the input part).
- First version of the GDML writer released in June, and available with GDML 2.0.0.
- Data model extended to cover parameterized volumes and replicas.
  - Currently under testing.
- Model has been extended to cover missing solids (polycone, polyhedra,...).
- Coming with 7.0.

Closed



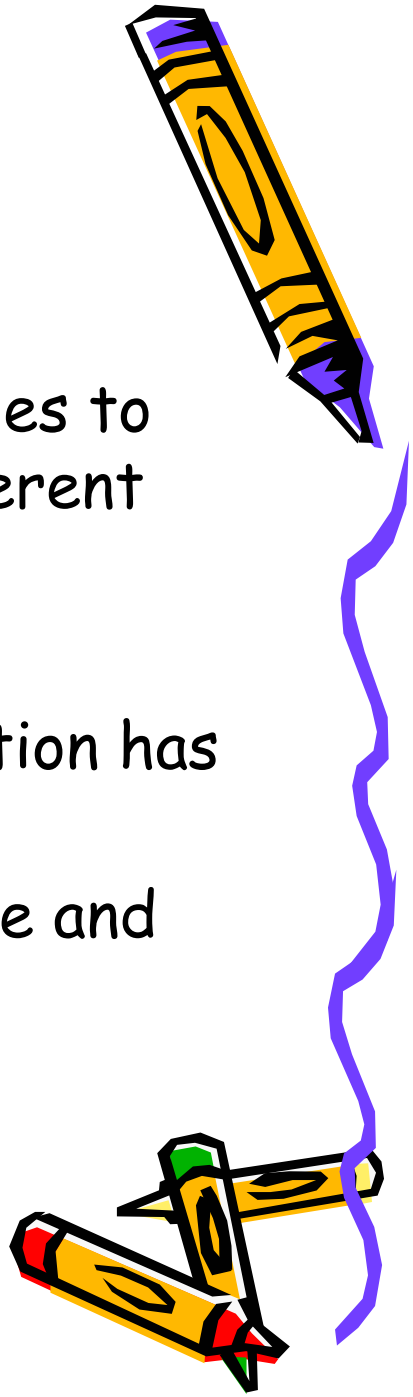
Req.0306: Storage retrieval of cuts/physics-tables

Responsible: M. Asai, H. Kurashige

Description: Extend retrieval of physics tables to case where the geometry is built in a different order than at storage.

- Note: this is related to Req.0208
- Design study and some partial implementation has been done.
  - Picking up some usable tables from a file and calculate only unavailable tables.
  - Work is in progress and expect to be released at 7.0 with an example.
- Requirement to be closed.

Closed



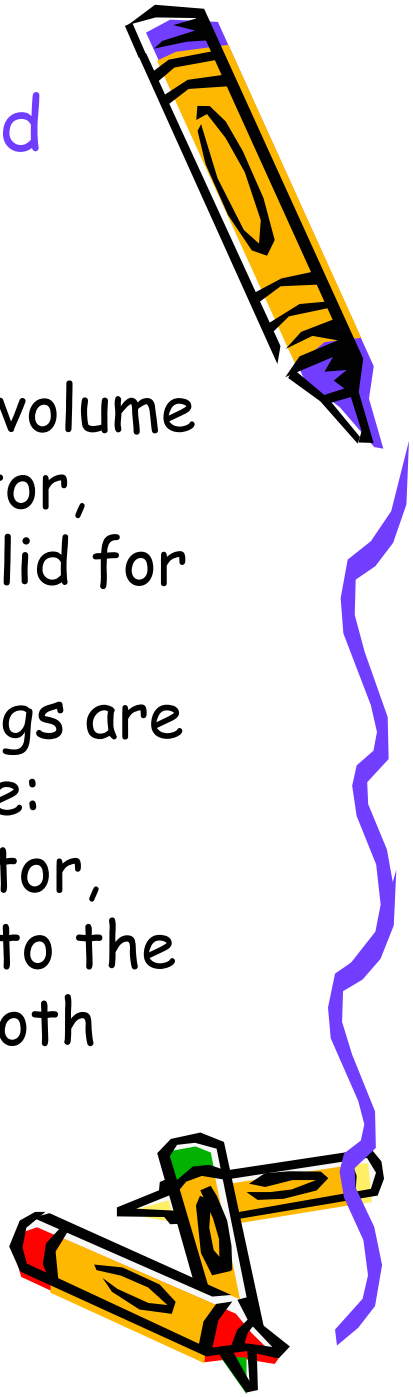
Req.0307: Region settings in reflected geometries

Responsible: G. Cosmo

Description: "If a region is assigned to a logical-volume and the volume is placed n-times in the detector, the region cuts are applied to all n regions (valid for all daughter volumes recursively). If the same volume is reflected m-times the region settings are not applied to the reflected volumes. "Example: when reflecting a whole endcap of a subdetector, we need to have the same region cuts applied to the reflected volume hierarchy (same physics in both endcaps).

- It has been implemented and to be released with 7.0.

Closed



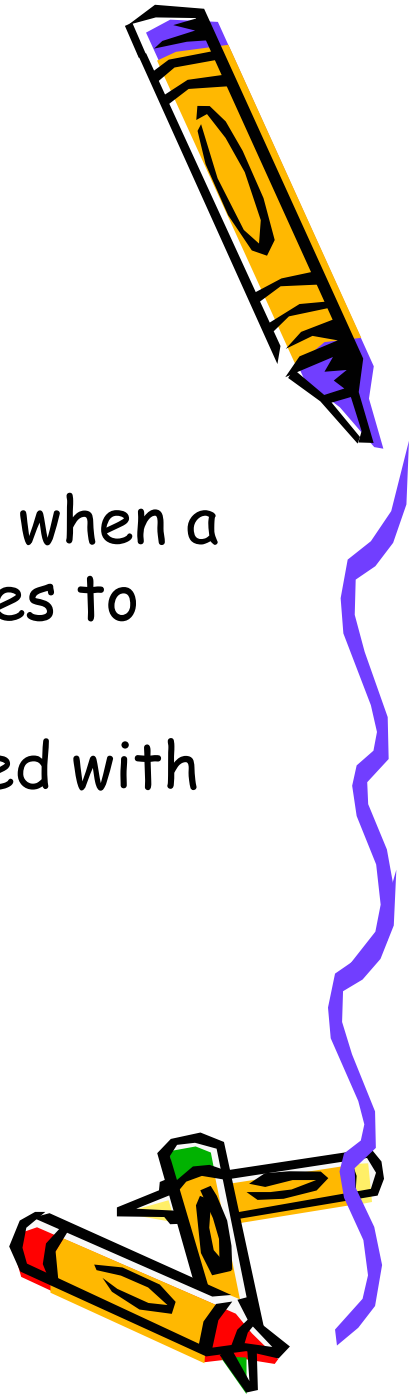
Req.0312: Possibility of customizing volume/solid creation step

Responsible: G. Cosmo

Description: "E.g. add a call to a user routine when a volume is created in order to add attributes to the volume (detectorName: other?) "

- It has been implemented and to be released with 7.0.

Closed



Req.0503: Possibility of adding new particles for searches of new physics

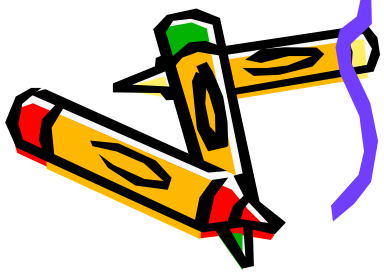
Responsible: M. Asai

Requestor: ILC, CMS, Atlas

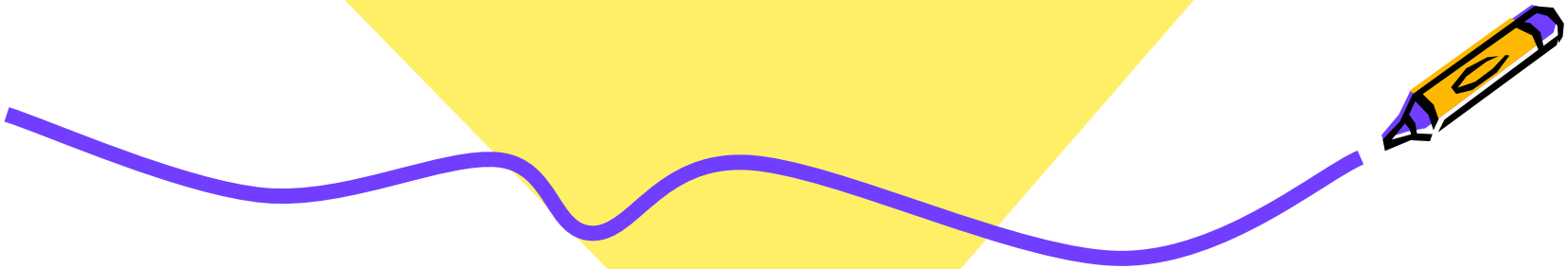
Description: "In searches for new physics where the particles have peculiar interaction, e.g. SUSY, some of these new models need to be benchmarked. How can we modify G4 to do this?"

Closed

- G4UnknownParticle, G4UnknownParticleDecay classes are introduced. G4PrimaryTransformer class becomes abstract to enable the user to add new particle types which are exotic to G4.
- Features are to be released at 7.0 with a new extended example.



Requirements closed by
October 2004

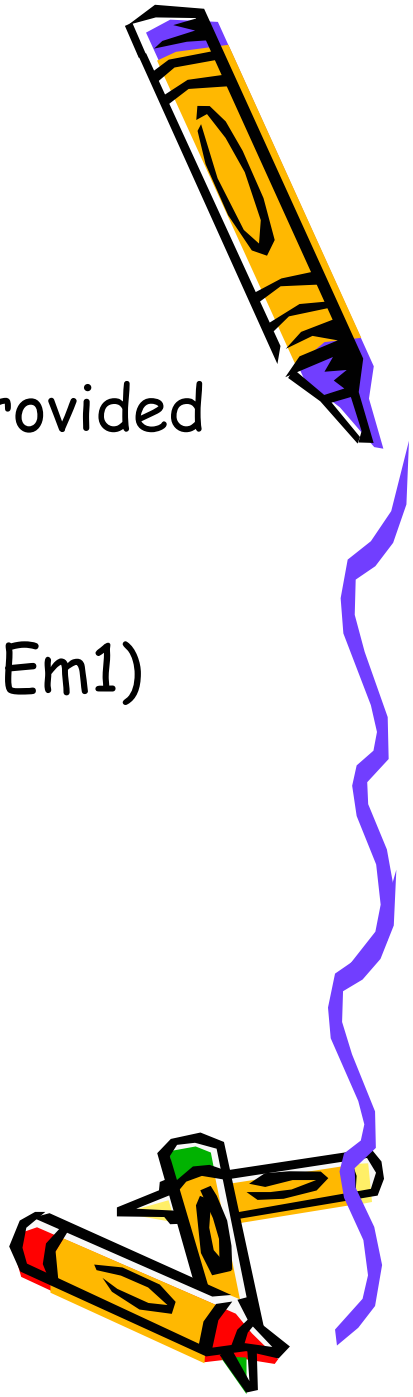


Req.0201 : Killing the primary in (electron) Bremsstrahlung

Responsible: V. Ivantchenko

- Concrete process for this purpose has been provided to the requestor.
  - And being publicly released with 6.2.
- For potential 'general case', an example (TestEm1) includes the implementation class.

Closed



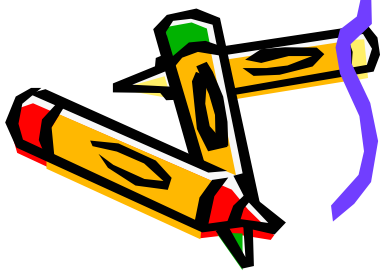
Req.0301: Robustness of G4 and improved diagonostics to give more handels to solve problems

Responsible: H.-P. Wellisch / G. Cosmo

Description: The LHC experiments CMS and LHCb are entering production now. Occasional crashes are seen in simulations of files containing several hundered events. These problems will have to be tackled and removed. Additional information given/printed during the abort will help to localize the problem.

Closed

- Some enhancements have been released at 6.1.
- Proposed to be closed.



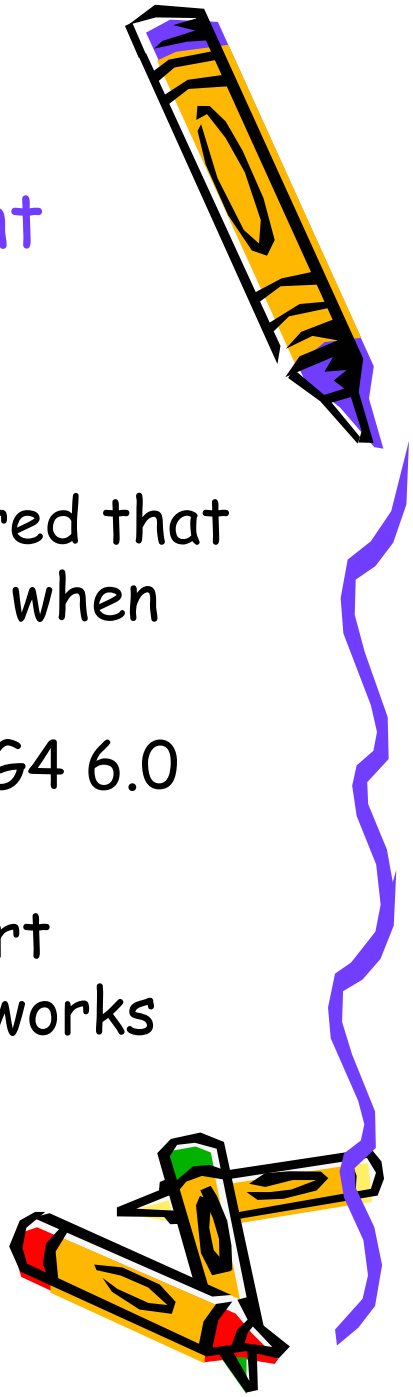
Req.0302: Reproducibility when resuming of runs at an event different from the first one

Responsible: G. Cosmo

Description: For debugging purposes, it is required that one can reproduce a particular event exactly, when one starts the simulation from that event.

- Some fixes for uninitialized variable were in G4 6.0 and experiment programs.
- It should be checked again, in a common effort between the experiments and G4 whether it works with the present G4 6.1.

Closed



Req.0305: Ability to release the memory of an Allocator 'stack' on request

Responsible: G. Cosmo

Use case: "Step behavior is seen in the memory usage during event file simulation."

- New G4Allocator and related classes have been worked out and released with 6.2 p01.
- Requirements to be closed.

Closed

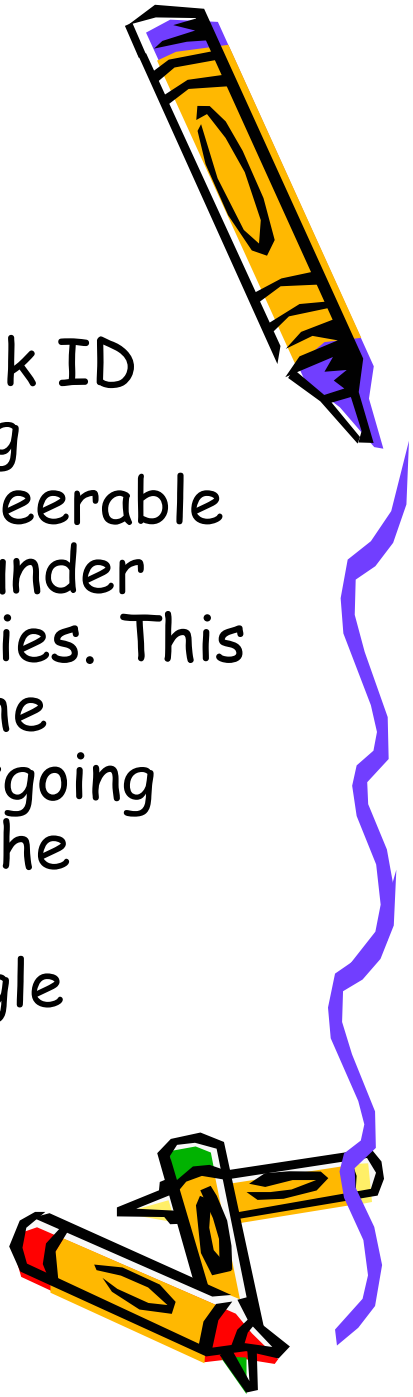
Req.0308: Creating a new daughter particle

Responsible: H.-P. Wellisch

Description: The possibility to assign a new track ID (creating new particle) to a hadron undergoing inelastic scattering, in all physics lists, and steerable from the physics lists. The choice should be under user control since it depends on specific studies. This is necessary to understand the behavior of the tracking for example where if the leading outgoing particle has very different kinematics from the incoming particle it can be misleading [to reconstruction programs to see this] as a single particle.

Closed

- New feature is released with 6.2.
- Requirements to be closed after verification.



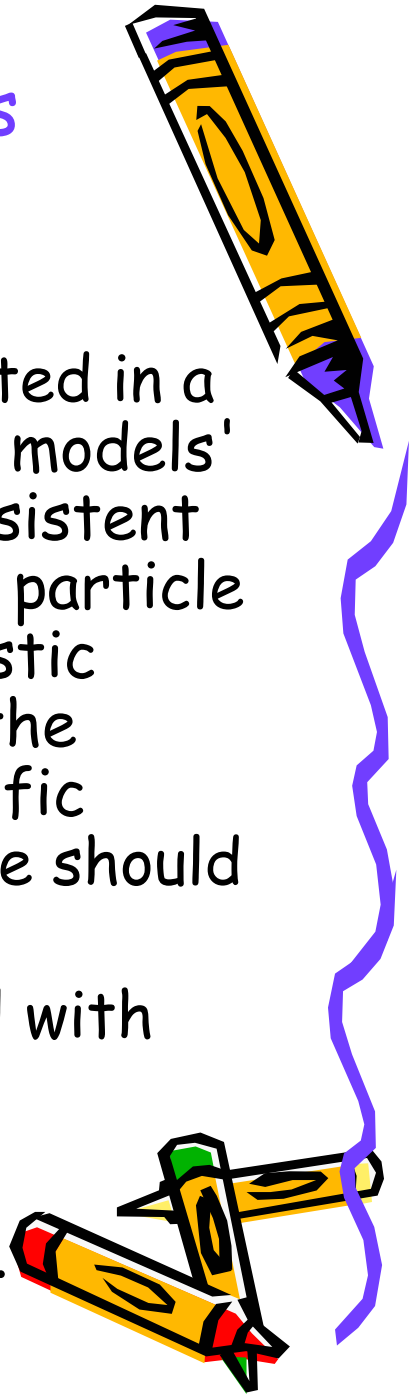
Req.0310: Consistent behavior across use cases

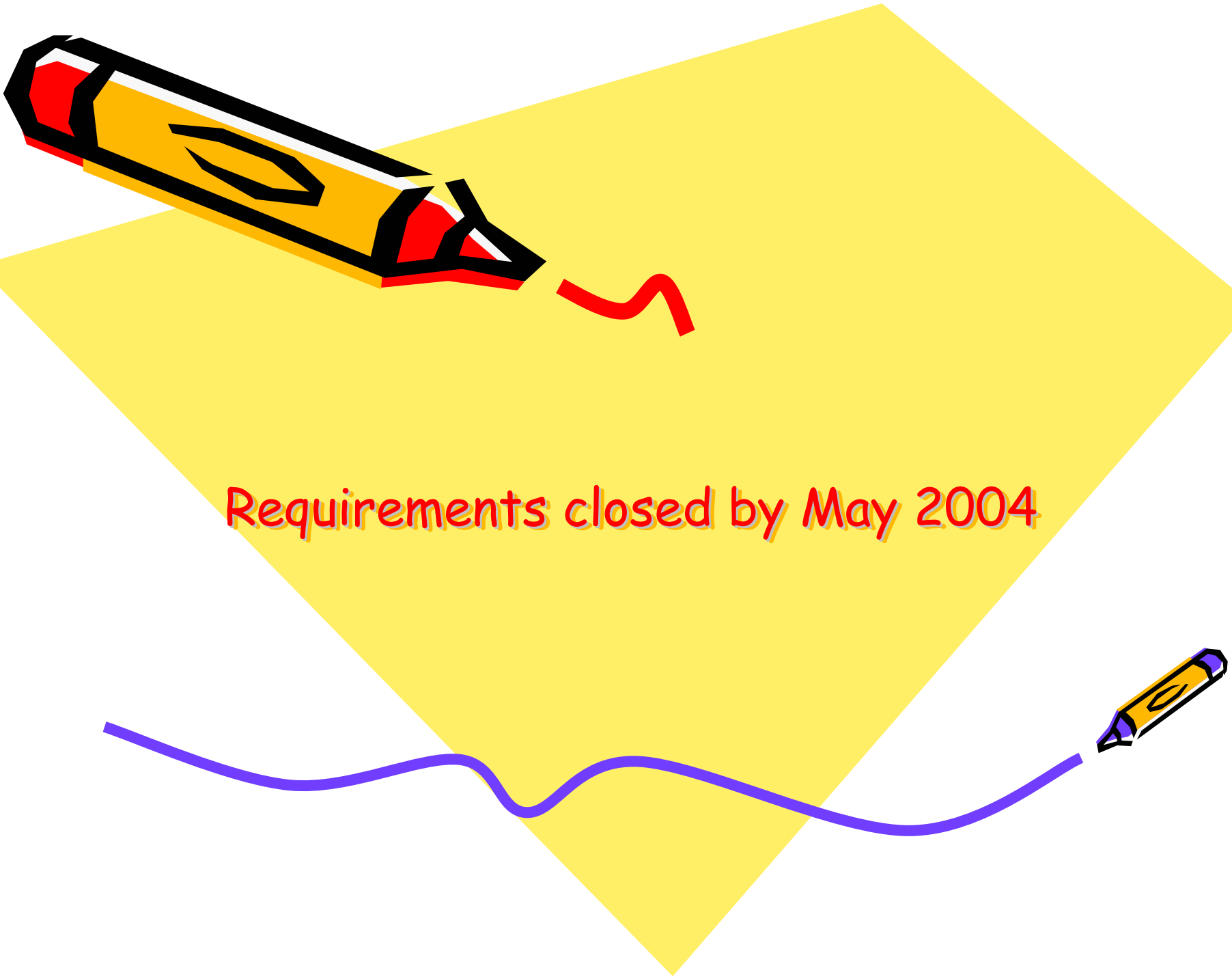
Responsible: H.-P. Wellisch

Description: "A physics list should be implemented in a coordinated way regarding the output of the models' behavior, so that such behavior would be consistent as much as possible. For example an incoming particle should always be (or not be) killed in all inelastic scattering models of a given physics list. In the cases where this is not possible (due to specific characteristics of the models) the difference should be clearly described."

Closed

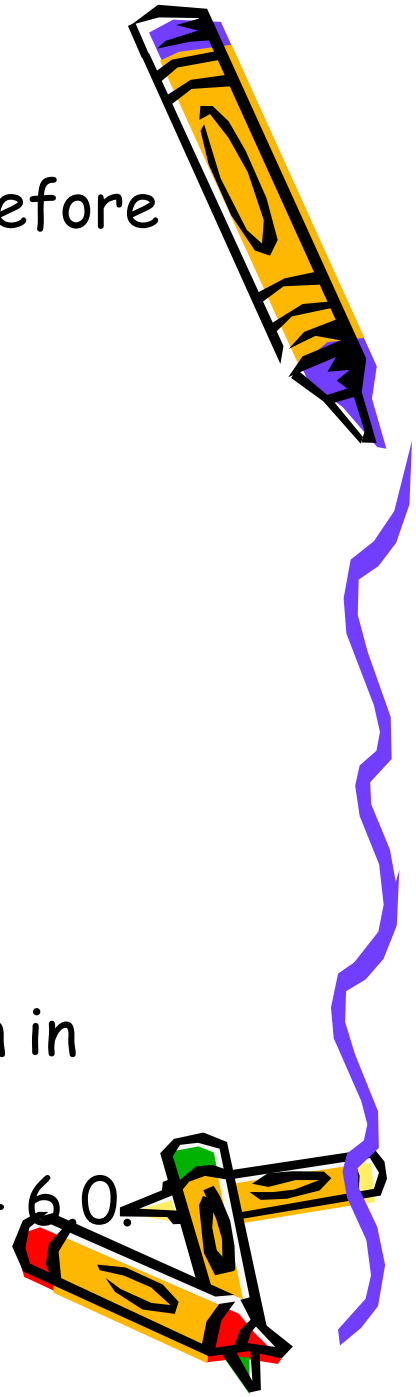
- This requirement is identified to be identical with Req.0308.
- New feature is released with 6.2.
- Requirements to be closed after verification.




Requirements closed by May 2004

Recently closed requirements

- Req.0101 : Access to the Track properties before hadronic processes are invoked
  - Feature released with G4 6.1
- Req.0107 : Installation kit which contains all packages
  - http://geant4.slac.stanford.edu/g4cd/
- Req.0203 : Pre-defined decay products
  Req.0204 : User-defined MC truth
  Req.0205 : Maintaining event generator information
  Req.0207 : Depositing additional information in calorimeter hit
  - All of required features released with G4 6.0.



Recently closed requirements

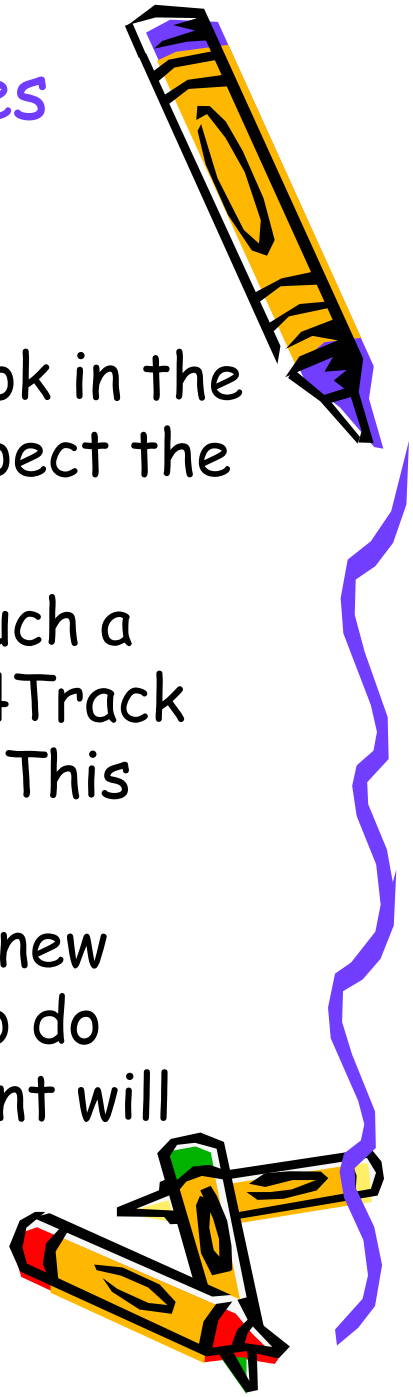
- Req.0206 : Physics modeling options and consistency
  - Feature released with G4 6.1
- Req.0202 : Abstraction of geometry navigation / modeling
  - Feature released with G4 6.0
  - Further requirements awaited
- Req.0209 : Physics lists capabilities and choices
  - Since G4 6.0, physics lists are distributed along the public release.

Req.0101 : Access to the Track properties before hadronic processes are invoked

Responsible: H. Kurashige, H.P. Wellisch

- The solution proposed is to add a new user hook in the hadronics processes to enable the user to inspect the final state for the hadronic processes.
- Design iteration to enable the placement of such a hook implies removal of ParticleChange and G4Track from hadronics except for level 1 framework. This was done in 6.0.
- The user hook is to be seen in the context of new needs of CMS for monitoring, and interests to do microscopic NIEL calculations. The requirement will be closed in the next minor release.

Closed



Req.0107 : Installation kit which contains all packages

Responsible: G. Cosmo / G. Folger

- We could offer it on a best-effort basis
  - as many customers require only current systems
  - new packaging will require additional effort to maintain, document, etc.
- For example, at the moment SLAC is maintaining an installation kit for Linux and Windows

  http://geant4.slac.stanford.edu/g4cd/

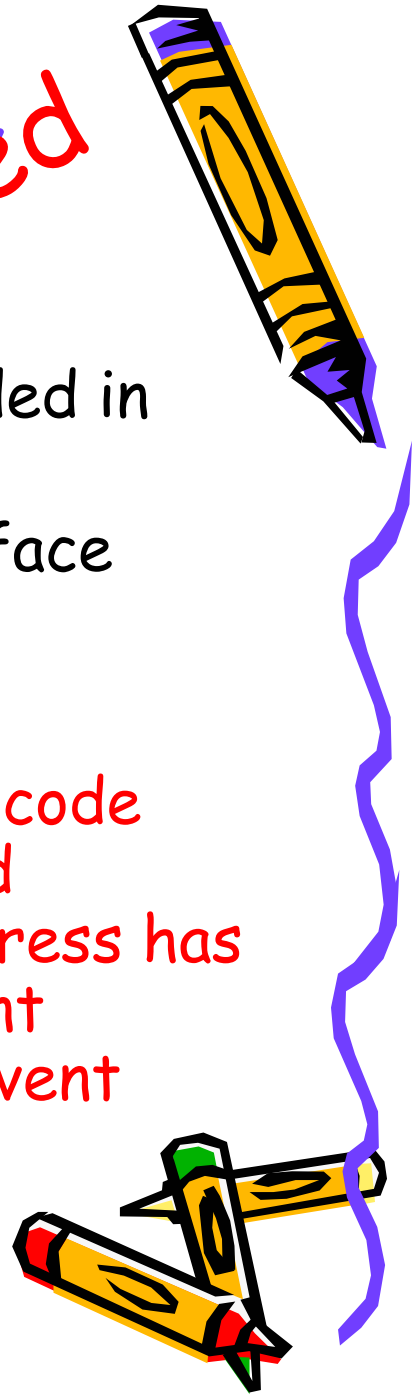
Closed

Req.0202 : Abstraction of geometry navigation / modeling

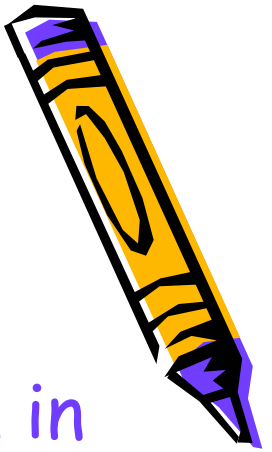
Responsible: G. Cosmo

To be verified by user

- First version of abstract G4Navigator provided in Geant4 6.0
  - first simplification/consolidation of interface
  - virtual methods for key functions
  - Feedback awaited (A. Gheata, BaBar)
- The integration of the BaBar transportation code into Geant4 as an alternative to the standard transportation is not yet started. Some progress has been made here, but there are still significant differences between the two codes that prevent them from being packaged together.
- Discussion between G4 Geometry WG and BaBar at workshop.



Req.0203 : Pre-defined decay products
Req.0204 : User-defined MC truth
Req.0205 : Maintaining event generator information
Req.0207 : Depositing additional information in calorimeter hit



Responsible: M. Asai

- All of required functionalities have already been released with Geant4 6.0.
- A sample code had been distributed to the users who requested these requirements and who expressed interests.

  http://www.slac.stanford.edu/~asai/NLD1.tar.gz
- A new example (exampleN08) derived from this sample code is under construction and it is expected to be released with the next public release.

Closed

Req.0206 : Physics modeling options and consistency

Responsible H.P. Wellisch

- New set of physics lists based on Geant4 6.0 will be available by the end of March 2004.
- If time permits, at that time the steering of the tailoring will be (optionally) independent of the G4UI (CMS request).

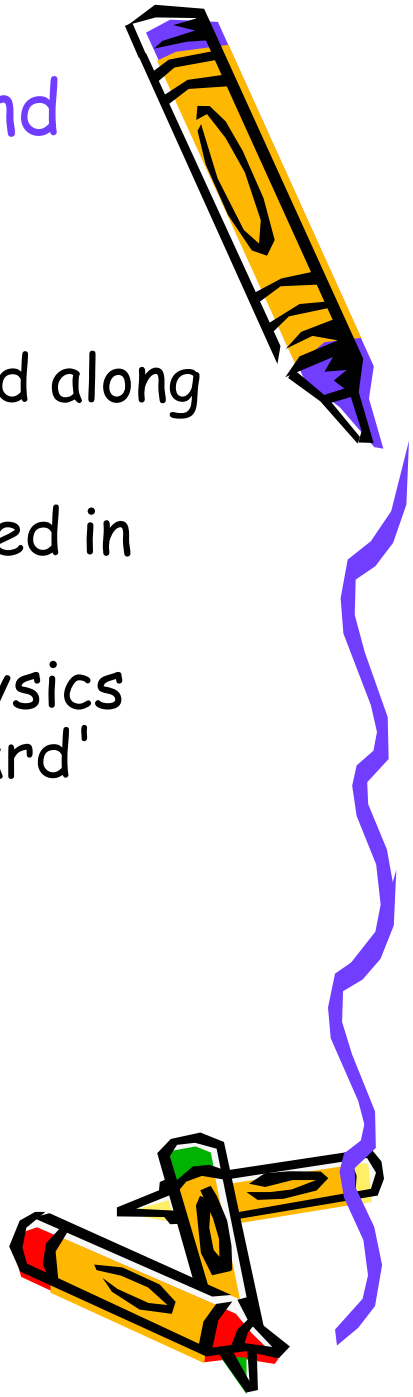
Closed

Req.0209 : Physics lists capabilities and choices

Responsible: H.P. Wellisch

- Since Geant4 6.0, physics lists are distributed along the public release.
- The physics lists will continue to be distributed in major geant4 releases.
  - Release notes were included in the last physics lists update and will be part of the 'standard' maintenance process.
- A physics list, when it is created, will print
  - information as to what physics is included,
    - it will be in the next revision
  - what use-cases it can be used for
    - it will be done once maintenance concerns for correctness are resolved.

Closed

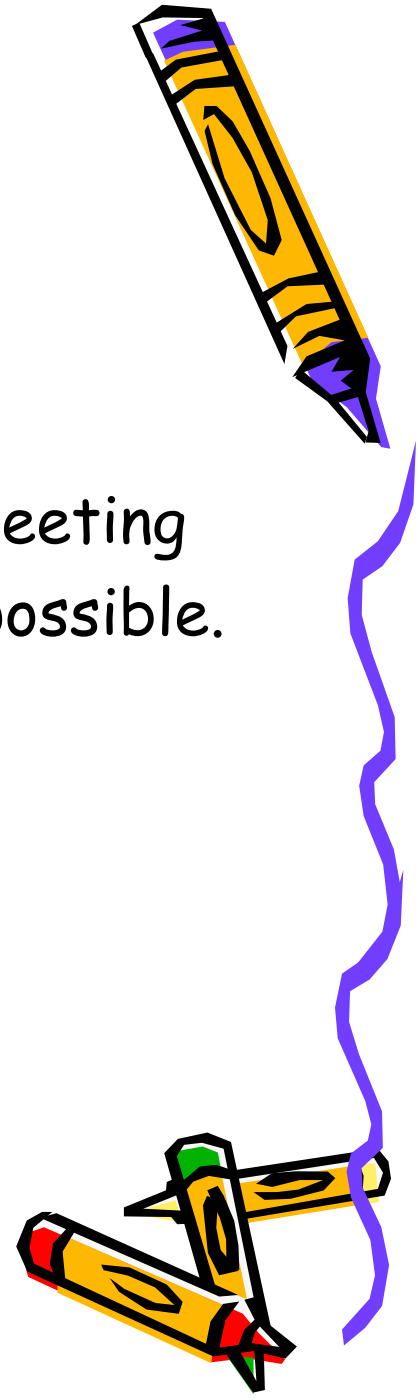


Req.0210 : Correction of known problems

Responsible: J. Apostolakis

- Agreement was reached at the previous meeting
  - to address open issues, to the degree possible.

Closed

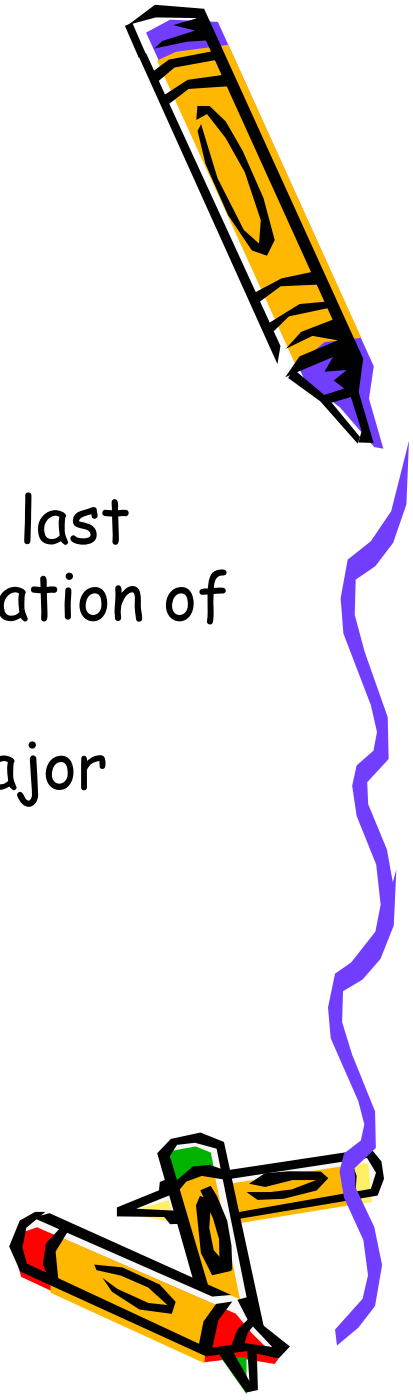


Req.0211 : Geant4 release type and frequency

Responsible: J. Apostolakis / G. Cosmo

- The proposal was discussed only briefly at last meeting, by common agreement. An explanation of current practice was made.
- G4 is requested early communication of major change requests.
- No further action is currently foreseen.

Closed



Longer term requirements
- Under development
- Under study