

Geant 4 Physics Book



Geant4 Workshop
TRIUMF
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History



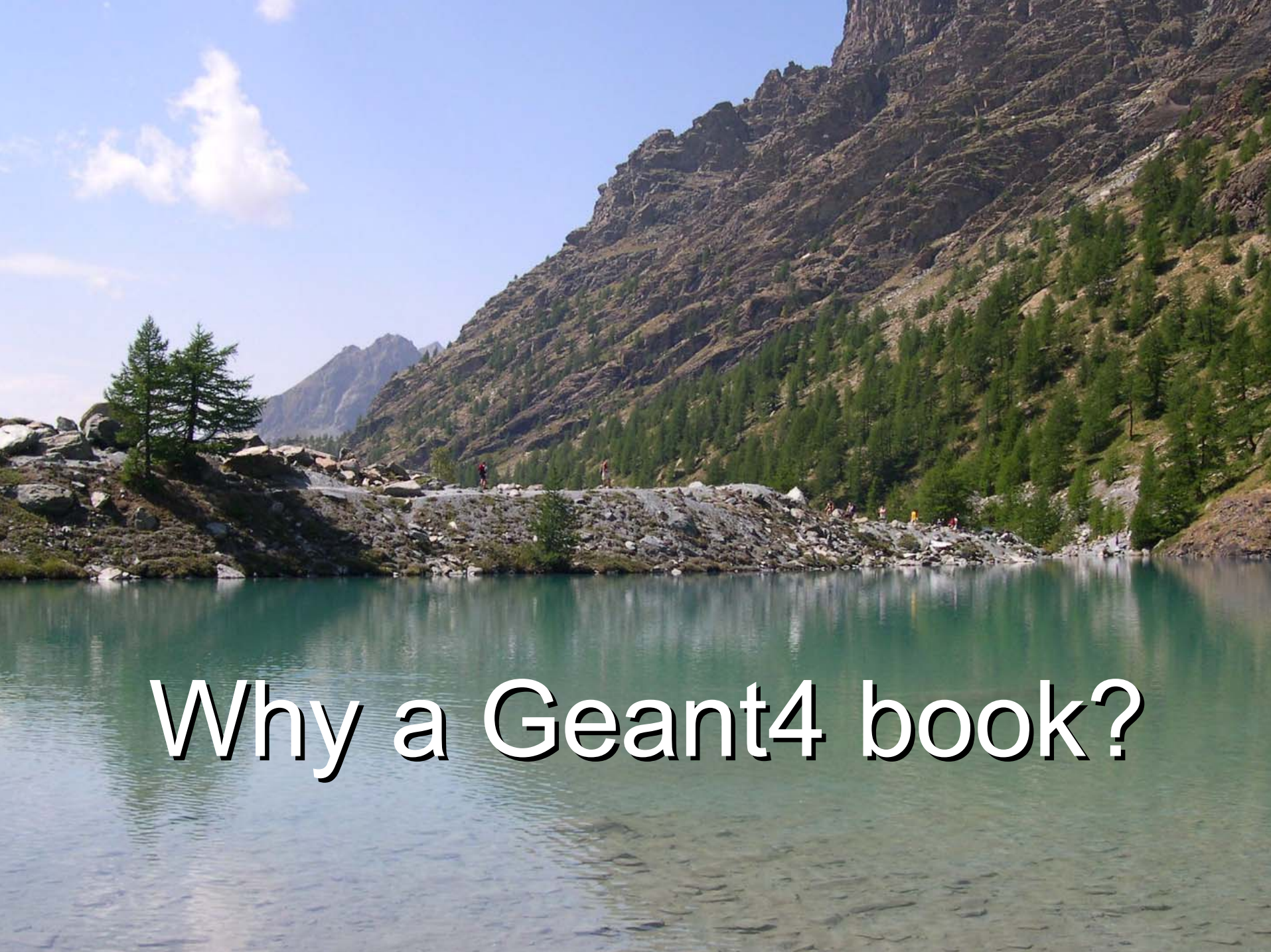
- The idea was born in August 2002, during a relaxing vacation in the Alps
- First, very preliminary comments with Jürgen last year
- Frozen for some time because of on-going MoU discussions
- Revived in spring 2003
 - informal discussions with a few collaborators and CB chairman to get some preliminary feedback
 - many positive comments
 - thanks to all for the encouragement, suggestions, enthusiasm, openness to contribute...
- Presentation at TSB meeting, June 2003
- Brainstorming meeting at CERN, June 2003

Previous examples

- **LEP Yellow Reports**
- **BaBar Physics Book**

- References that have retained their value for several years
 - even if the experiments evolved in the meantime
 - many students have studied on them...
 - many researchers have used them as an authoritative compendium

- ...it is up to us to invent our own model for a Geant4 Physics Book



Why a Geant4 book?

A reference

- For us developers:
 - to document the work done
 - to document the achievements of our product
 - to have a valuable reference in spite of the physiological turn-over of developers
- For the experiments/users:
 - to have a solid and comprehensive reference on Geant4 physics capabilities in their hands
 - to help new user getting started
- For our funding agencies:
 - to document the investment on a major software project they contribute to

A collaboration-wide project

- A collaborative effort
 - involving not only physics groups, but the whole Collaboration
- A variety of expertise needed
 - not only in physics!
 - vision, geometry, visualisation, analysis, testing, writing, coordination...
- A project involving a major, coherent effort and an ambitious goal would be **beneficial** to the Collaboration
 - strengthen team-spirit
 - provide scientific motivation
 - offer opportunities to our younger colleagues

How to shape it?

- It is up to us to decide...
- Many possible options
 - basic introduction to physics processes
 - Geant4 physics models
 - validation w.r.t. established references
 - critical evaluations
 - applications to relevant experimental configurations
 - the physics design
 - the process
 - ...

all to the level of detail, complexity, completeness that we wish...

- There is no unique solution
 - but we can discuss and find a reasonable, agreed pattern to adopt

Time scale

- It is up to us to decide...
- Realistically:
roughly 1 year for work + 3 months for final editing
- Risk: it will never be finished, Geant4 physics will always evolve
- *Yes, but the spirit is not to say the last word about Geant4 physics, rather to document a reference...*
- *Also LEP physics evolved (LEP II Yellow Reports), and BaBar physics too...*

A lot of work...

- No matter what is the pattern we decide to adopt, it is going to be **a lot of work**
 - guaranteed by experience!
- A lot of fun also...
 - that's also my experience!
- We can make our work more pleasant and effective with a good process
- We have many enthusiastic, bright young collaborators willing to contribute

BaBar Physics Book: I used to say that I left a drop of my blood in every page

(the book has > 1000 pages...)

Essential ingredients for success

(based on experience...)

- A **vision** for the project
- A clear, defined, realistic **deadline** for publication
- A set of defined, realistic **milestones**
- An initial small team to get started
- A group of dedicated people, determined to bring the project to success

- *Collaboration-wide support*
- *Team spirit*
- *Effective, continuous communication*
- *Forget about politics, power, please...*

Brainstorming meeting, June 2003

- Geant4 Physics coordinators, Katsuya, Gabriele, Andreas, John Ap., “girls”...
- Open, constructive discussion
- Main ideas
 - focus on validation
 - complementary approach: basic physics + use cases
 - to complement Physics Reference Manual
 - evolution “like in encyclopedias”: online update every (2-3) years
 - it is important to deliver a concrete product

A collaboration-wide effort

Open to
ideas,
suggestions,
contributions
from all collaborators

*Opportunity for discussion at this workshop,
with a wide participation of the collaboration*

Parallel session this afternoon

Goal: launch the project
Agree on scope, structure, rough time scale

First outline of the project: objectives
milestones
roles and contributions

