



The future of STEAM

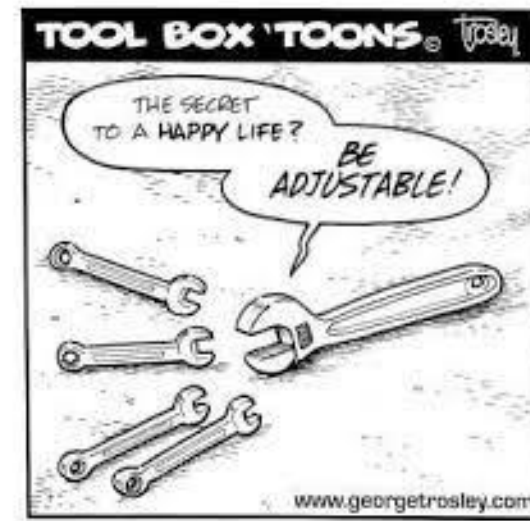
E. Ravaioli and M. Wozniak
On behalf of the STEAM team

15th October 2021

2nd STEAM Workshop

What this session is about?

- We would like this session to be very interactive
- Please let us know your thoughts on each topic that we present



For each slide we would like to know:

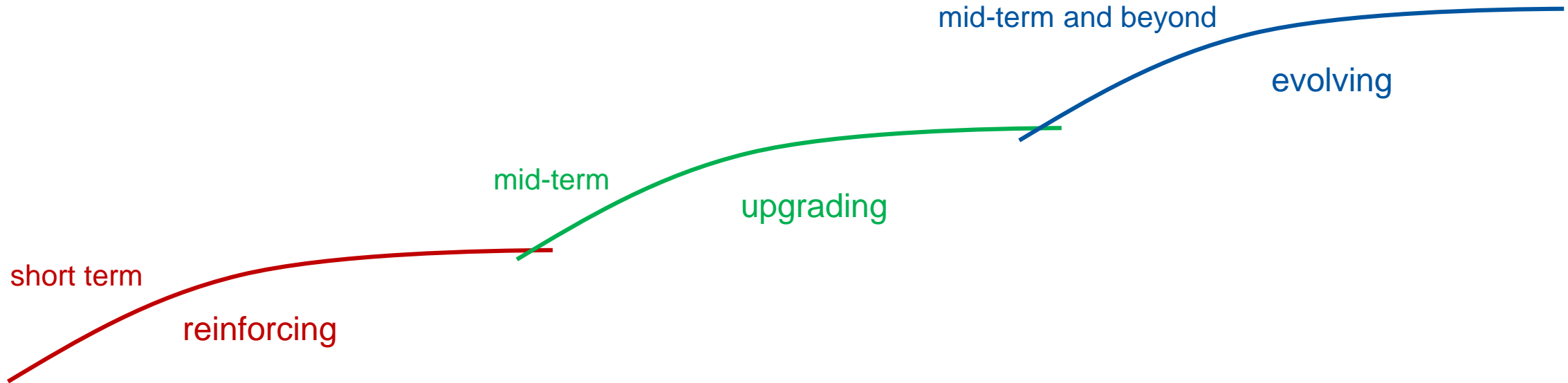
- What are your thoughts?
- Would you use this feature / benefit from development?
- Could we do it a different way?
- Do you have experience in this topic you could share?
- Do you know a colleague who would be interested or could help?

Thoughts?
Benefits for you?
Different way?
Your experience?
Contact person?

These are abbreviated on each slide as a reminder



STEAM strategic priorities



Mission

Develop capability and know-how for simulation with an appropriate utilization of established and modern technology. Engage community in framework adaptation and validation by sharing well documented tools and models. Support tools that are part of STEAM and welcome integration with externally developed code.

Values

continuity, readiness, simplicity, recognition, completeness, maintainability

Vision

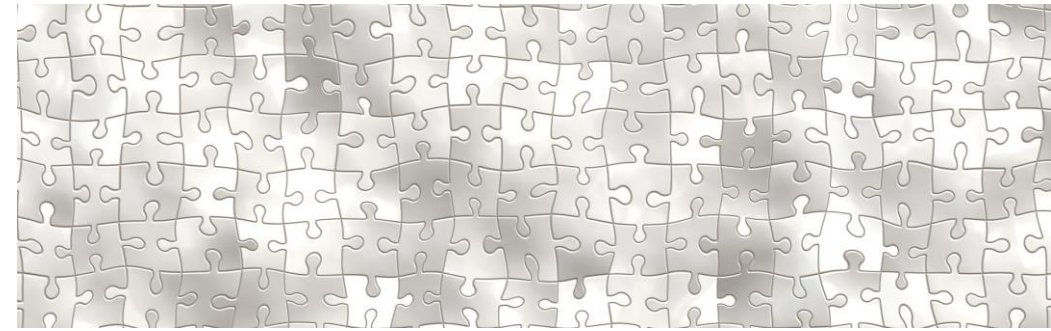
Achieve specialized, trusted, consistent, repeatable and sustainable software tools and models for rapid **S**imulation of **T**ransient **E**vents in **A**ccelerator superconducting **M**agnet circuits.



STEAM strategic priorities

short term

reinforcing



Increase reliance on the same input files for generating models across the STEAM framework

Broaden capability to simulate all LHC and HL-LHC superconducting magnet circuits

Improve capability for scripted model validation

Increase number of codes covered with software testing

Continue to maintain and version control our models

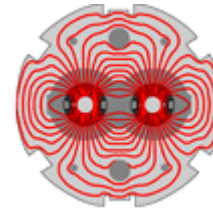
Keep simulation tools and circuit/magnet models ready to analyze transients occurring in LHC/HL-LHC

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LHC



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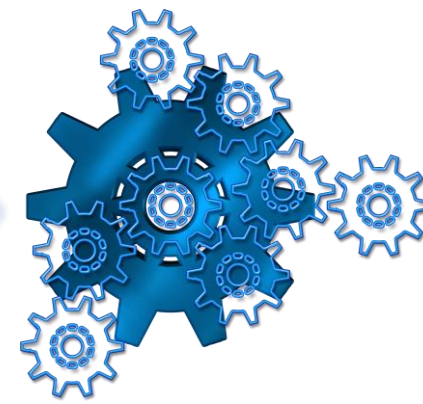
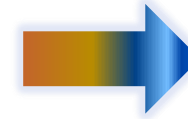
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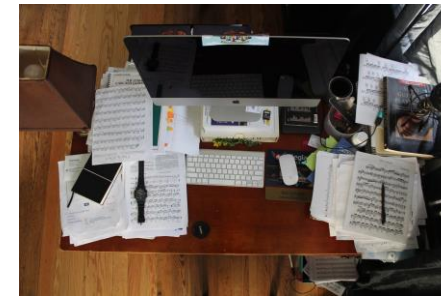
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Review and improve High Performance Computing* capabilities

Decrease dependency on commercial software

Further streamline validation of models with measurements

Improve scripting capabilities for model building, solving and postprocessing

Improve capabilities and provide examples for interfacing with advanced parametric analyses **

Thoughts?
Benefits for you?
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Contact person?

*Both shared and distributed memory clusters, with focus on machines available at CERN

** and design exploration, model calibration, risk analysis, and uncertainty quantification

STEAM strategic priorities



COMSOL
MULTIPHYSICS® 



PSPICE



ONELAB, GetDP, Gmsh



What are your thoughts on GetDP replacing Comsol ?
What do you think of free FE solvers ?
Would you recommend other FE tools ?

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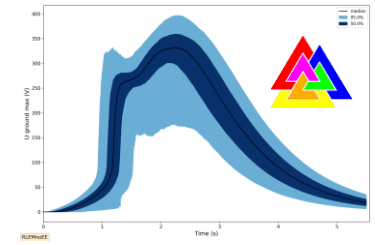
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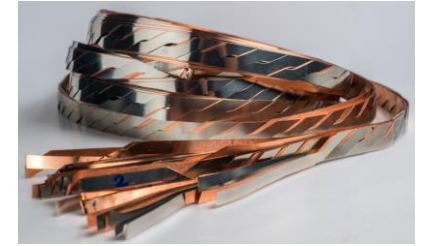
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STEAM strategic priorities

mid-term and
beyond



evolving



Adapt tools to the needs of new magnets, in particular High Field Magnet (HFM) programme at CERN

For the above, include all physics relevant for quench protection and powering transients

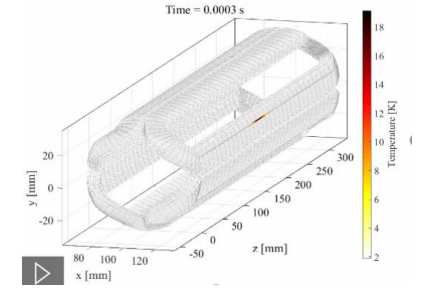
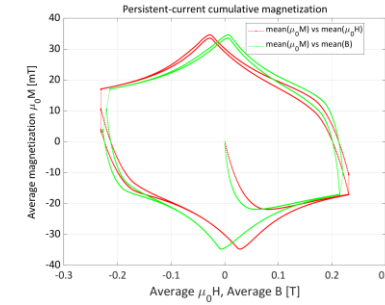
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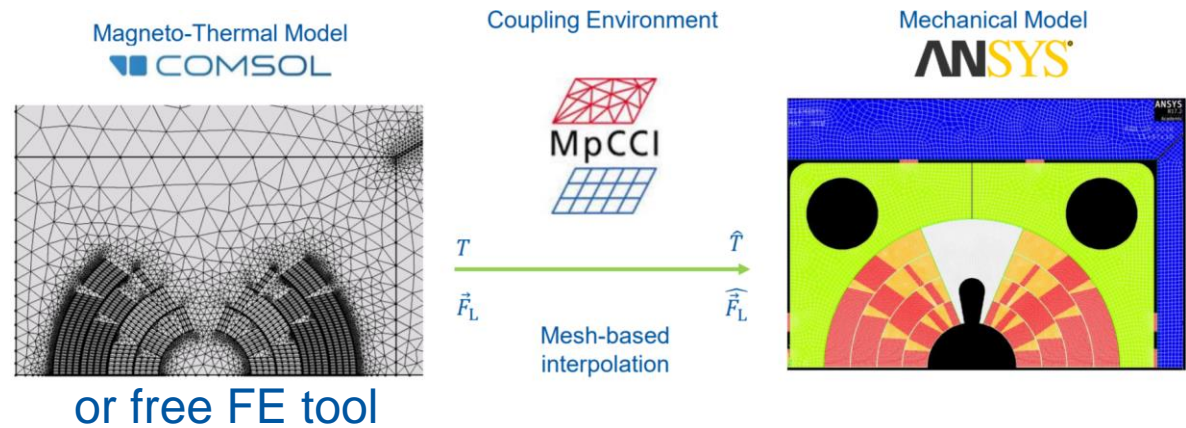
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* Some previous work: <https://indico.cern.ch/event/712782/contributions/2928119/attachments/1616581/2569496/MechanicalStressDuringQuench.pdf>

Discussion time !!!



What are we missing in our strategic priorities?
Features, tools (inc. FE), magnets, languages, materials?

What stops you from using STEAM tools?

Are any long-term topics more urgent than we think?

Anything else related to STEAM we should know?

Thank you for attending
the 2nd STEAM Workshop



<https://espace.cern.ch/steam/>

steam-team@cern.ch

