Core Working Group Updates

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GAMBIT XV
WG Members

- Recently active members
  - Tomas Gonzalo (convenor)
  - Anders Kvellestad
  - Chris Chang
  - Pat Scott
  - Patrick Stoecker

- Formerly active members
  (please come back)
  - Markus Prim (convenor)
  - Peter Athron
  - Fruzsina Agocs

- New members to list (?)
  - Alex Woodcock
  - Adil Jueid
What is Core?

Main
Diagnostics
Dependency Resolver
Likelihood Container
YAML Parser

Build
GUM

Backends
Printers
Logs
Elements
Utils
Why join core?

- We have cake!
- Find out what goes on under the hood in GAMBIT
- Learn/get better at coding in C++, Python, Fortran, and more
- Lower threshold for authorship in long-author papers
- Usually more likely to be invited to participate in short-author papers
- We really really need more people

T. Gonzalo (KIT)
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Recent updates

GAMBIT 2.3.0, 2.3.1, 2.4.0, 2.4.1

- Support for EWMSSM plus gravitino, DM simplified models
- SM measurements, DM indirect detection with antiprotons
- New LHC searches and dijet searches
- New backends: Rivet 3.1.5, Contur 2.1.1, ATLAS FullLikes, simple_xs, pbarlike 1.0
- Updated backends: DarkSUSY 6.4.0, HepLike 2.0, DDCalc 2.3.0
- Added ColliderBit dependencies: HepMC 3.2.5, YODA 1.9.7
- Core: MSSM model tree, metadata, scanID, process lock
- Increase supported pybind11 version to 2.10.1
- Improved support for OSX
- Updates to GUM & BOSS
- Bugfixes++
Unreleased updates

- Changes merged to the **master** branch but not yet released
- Mac runners
  - new CI tests on OSX (x64, arm64)
  - machines are UQ, not sure yet what’ll happen when CC leaves
- Remove Python 2 support
  - GAMBIT will no longer support python 2 backends
  - python 2 CI tests removed
- Rules objects
  - Complete reworking of rules and obslikes
  - PS to talk about it later today
Unresolved PRs

- Add diagnostics for module functions and backend functions
- Defining and Enforcing a Code Style
- Make diagnostic system aware of un-compiled modules
- Patch to the yaml_node_utility made by Andy
- BOSS typedef header
- Cmake system for downloading datasets
- Vevacious dependencies
- Python scanners
- Contur 2.1.1→2.4.1, Rivet 3.1.5→3.1.8 upgrade
- Two Higgs Doublet Models
- Cmake scan fix
- Reinstated intel classy compilation

T. Gonzalo (KIT)
Core
GAMBIT XV
7/10
Major Core projects

Template BOSS      AK, TG

- Backend C++ codes
- Not working if X is templated
- Jan 2022: Pawsey interns
  Zelun Li & Joel West

- Generic templates
  Specialized templates
- Abstract classes

- Wrapper classes
- GAMBIT typedefs

- Finished sometime earlier this year (except template covariance)
- Works with FlexibleSUSY (after some patching)

```cpp
template <T> class X
template<> class X<int>
Abstract_X<T>
Abstract_X<int>
MyBackend_1_2::X<int>
MyBackend_1_2::X__int
```
Major Core projects

SpecBit redesign
- Joint Precision + Core project
- Uses template BOSS, working for FS since recently
- Most things ported to use new Spectrum class
- Only missing functionality is running spectrum

HDF5 Printer
- HDF5 v2 not working on some systems
- Help from Pawsey to resolve

Fast-slow scanners
- Joint Scanner + Core project
- Many subtasks pending in Core TODO list
Major Core projects

GAMBIT 2

- Any non-documented code since GAMBIT 1
- Big Core changes
  - Python backends
  - Template BOSS
  - Dependency resolution changes: subcaps
  - New rules objects
  - Citation system
  - New printers
  - ...

- Undocumented module development
  - SpecBit redesign
  - FlavBit redesign (undocumented)
  - ColliderBit redesign (CBS?)

- Full list of expected items in draft