Karlsruhe Institute of Technology

Institut für Experimentelle Kernphysik

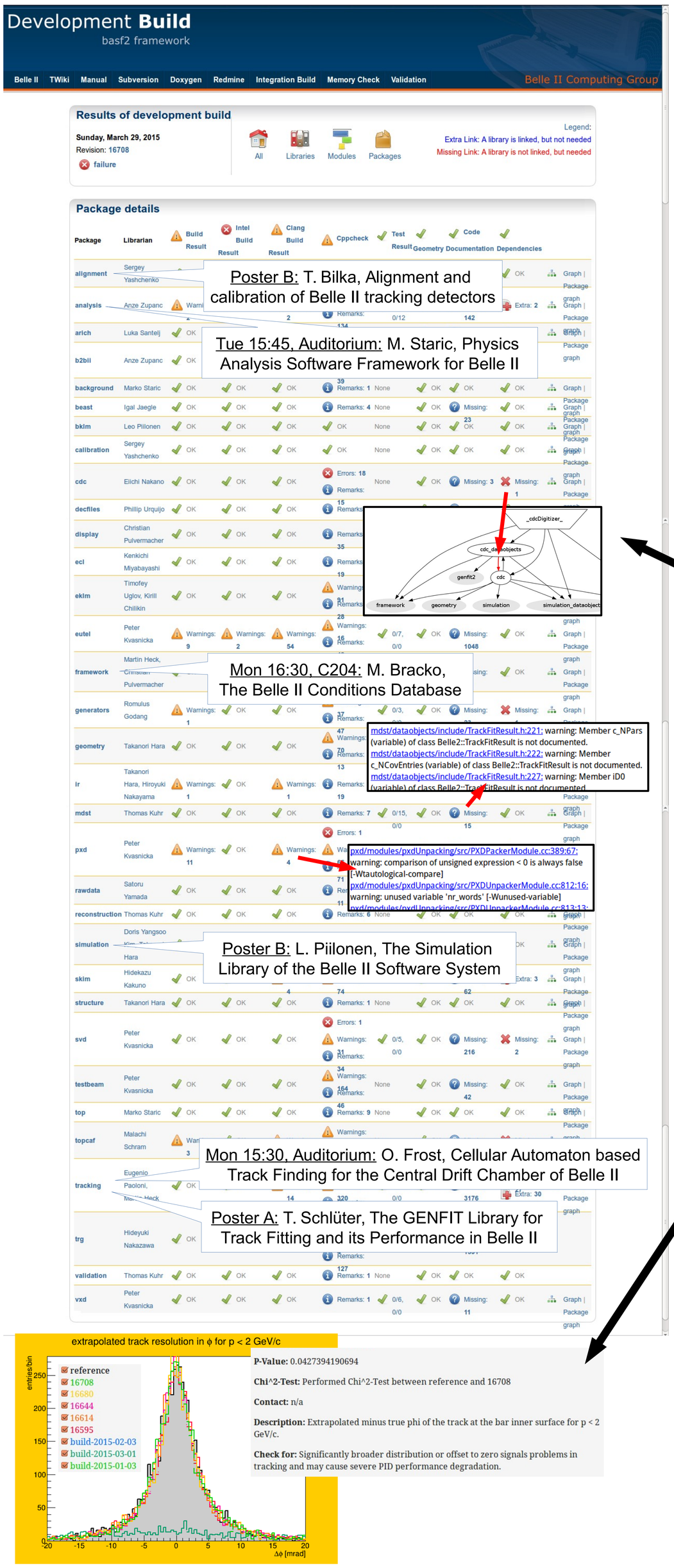
Software Development at Belle II

Thomas Kuhr, Thomas Hauth

- **Aim: Reliable, sophisticated, and easy-to-use software for acquisition, simulation, reconstruction, and analysis of Belle II data**
- **Challenge: Regional distribution, different (cultural) backgrounds and skills of developers**

➔ *State-of-the-art tools, balance between common rules and individual freedom, communication*

Country	Active Developers	Commits Last year
Australia	6	64
Austria	3	384
Canada	2	13
Czech Rep.	3	101
Germany	24	2424
Italy	6	163
Japan	17	759
Korea	4	26
Mexico	1	3
Poland	2	13
Russia	2	16
Slovenia	5	246
Taiwan	1	1
Turkey	1	2
US	7	257



Tools:

- C++11 (*gcc 4.7*, *clang 3.4*, *icc 14*), python for steering files → metaframework for analysis (see talk by M. Staric)
- Central *svn* repository, code browser
- *Astyle* for C++ and *pep8/autopep8* for python code style, checked on commit
- *Redmine* for issue tracking
- *Doxygen* and *twiki* for documentation
- *Googletest* for unit tests, *valgrind* for memory check
- Validation framework for regression tests
- *Buildbot* for several automated tasks:

build-incremental	16709 build successful	idle
build-sl5	16709 failed compile	idle
build-sl6	16709 warnings compile	idle
build-ubuntu1404	16709 warnings compile	idle
build-ubuntu1404_32bit	16709 warnings compile	idle
development	16708 failed compile compile-intel compile-clang compile-opt	waiting next in ~ 11 hrs 47 mins at 05:32
ekp-release	15909 warnings compile	idle
ekp-tools	16379 build successful	idle
externals-sl5	#24 warnings compile	idle
externals-sl6	#22 warnings compile	idle
externals-ubuntu1404	#5 warnings compile	idle
externals-ubuntu1404_32bit	#5 warnings compile	idle
externals_src	16520 build successful	idle
kek-release	15909 warnings compile	idle
kek-tools	16379 build successful	idle
memcheck	#772 warnings compile	building
monthly	#275 build successful	waiting next in ~ 6 hrs 15 mins at 00:00
release-sl5	15909 warnings compile	idle
release-sl6	15909 warnings compile	idle
release-ubuntu1404	15909 warnings compile	idle
release-ubuntu1404_32bit	15909 warnings compile	idle
release_doc	#35 build successful	idle
tools-sl5	16379 build successful	idle
tools-sl6	16379 build successful	idle
tools-ubuntu1404	16379 build successful	idle
tools-ubuntu1404_32bit	16379 build successful	idle
validation	16708 warnings compile	waiting next in ~ 11 hrs 47 mins at 05:32

- Incremental build on commit for fast feedback
- Full builds with different compilers and system on commit, email of new errors/warnings to authors
- Nightly build, mem-check, and validation, email of problems to librarians
- Installation of new tools and releases at sites
- Compilation and creation of binary distribution tarballs for different system for externals and releases
- Monthly build of tagged packages

Organization:

- Subgroups for database, generators, simulation, background, tracking, alignment
- Software organized in packages with a responsible librarian who controls write access and can tag the package
- Monthly integration builds of tagged packages and feature driven releases
- Weekly developers meetings, two workshops per year, joint sessions with other groups at collaboration meetings