

FACETS Winter meeting 2011 Welcome!



Let's get the names right!

ANL (solvers): McInnes, Zhang, Balay, Farley, McCourt

CSU (coupling research): Estep, Sheehan

GA (exp, GYRO): Groebner, Candy

LLNL (edge physics): Cohen, Rognlien

LLNL (interlanguage, component load bal.): Epperly

ORNL (composers, dashboard): Cobb

ParaTools (performance analysis): **Spear**, Malony, Shende

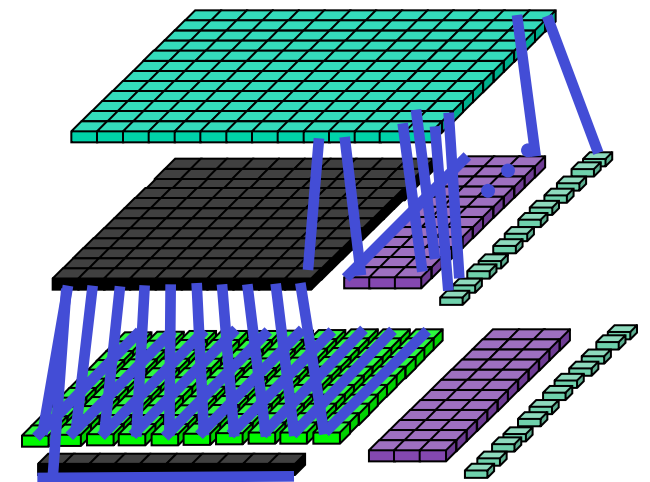
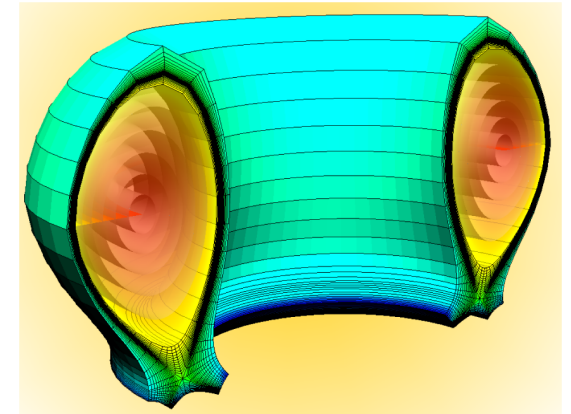
PPPL (core sources, algorithms): McCune, Hammett

UCSD (wall): Pigarov

Tech-X (framework, core):

Fusion: Carlsson, Cary, Hakim, Kruger, Pankin, Pletzer,
Vadlamani, Miah,

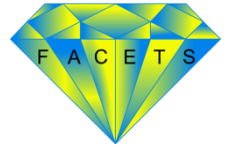
ASCR: Alexander, Durant, Green, Shasharina



Thanks to you folks for
making this work!



The important stuff



- WiFi
- Bathrooms
- Our next meeting: Aug 11-12

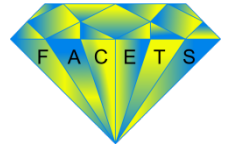


You will need to fix up the repos



- <https://ice.txcorp.com/svnrepos/code/facetsweb> is for all materials (like meetings) that go on the web.
- Yearly repos, like <https://ice.txcorp.com/svnrepos/collabs/facetscollab2011>, are for all other documents.
- Keeps downloads smaller
- We will add needed dirs from facetsweb as externals to yearly repos
- Pls do:
 - ◆ `cd facetscollab2011/meetings`
 - ◆ `mv 24Feb11 24Feb11.sav`
 - ◆ `svn up`
- Put what you need from 24Feb11.sav into 24Feb11

FACETS Vision(s)



- To produce a highly configurable, whole-fusion-device computational application that can be run on any *unixish* machine from laptops to exaflop machines effectively and make use of the simplest to most computationally intensive models.
- To develop an open and transparent framework that allows contributions from anyone, and is available to all (who contribute?)



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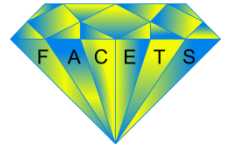


ParaTools



TECH-X CORPORATION

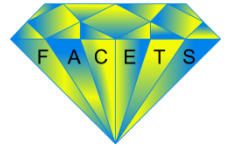
FACETS Strategy



- Create a flexible, parallel, object-oriented application capable of instantiating different physics at run time
- Follow migration path to produce robust, statically linkable components that can be brought into the framework on any platform
- While allowing
 - ◆ communication to off-HPC components
 - ◆ appropriate error handling
 - non-critical components can disconnect
 - critical components cause graceful shutdown
- Bring in new (hopefully better engineered) components as they become available



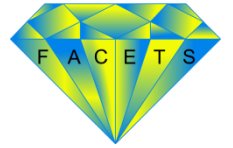
FACETS Philosophy



- Continuous integration
- Test driven
- Make it work, then make it pretty and easy
- Adaptability to new hardware
- Adaptability to new software that addresses a need or makes us more productive
- Quality monitoring and assurance is continuous and permeates the project (Any component failure propagates)
- Specialization is avoided, but expertise is valued
- No one owns any part of the project (anyone can contribute anywhere), but
- Respect conventions, architecture
- Give credit where it is due, but generously



Where are we? Where are we going?



- **Accomplishments**
- **Our place in *the plan***
- **What do we need next?**
- **Future:**
 - ◆ **Exascale (FACETS is part of CERF)**
 - ◆ **SciDAC 3 (was FSP)**



We have made a number of accomplishments



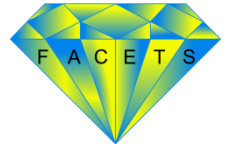
● Field hardened

- ◆ Highly portable, robust multi-component system capable of accepting components in C, C++, Fortran
- ◆ Verification (core-astra)
- ◆ Implicit solver, coupling (needs Newton)
- ◆ Componentization of UEDGE, NUBEAM
- ◆ Robust workflow (multi-platform, multi-parallel architecture)
- ◆ Uniform visualization using standard tools (VisIt, matplotlib)
- ◆ Abstract access to subgrid transport models
- ◆ Automatic builds and tests of our

- **Physics results on coupled, core-edge transport**
- **Installations at all major facilities**
- **Load balancing**
- **Implicit core-edge**



We are still crossing the Valley of Death



- Concept formed
- Team formed
- Technology demonstrated
- Technology usable
- Early adopters on board
- Technology robust
- First physics results
- ~~● First publications~~
- Benefits widely demonstrated
- Further investment
- Wide acceptance

Aug 2010

Feb 2010



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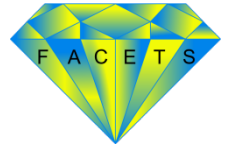


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Needs



- **Just more**
 - ◆ **Dashboard**
 - ◆ **Composer**
- **Completion**
 - ◆ **Load balancing**
 - ◆ **Wall integration**
 - ◆ **Dynamic equilibrium**
 - ◆ **Predictive edge (subj to state of art)**
 - ◆ **ITER simulations**
 - ◆ **RF sources**
 - ◆ **Stability**



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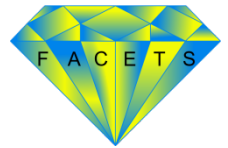
Future...



- **Exascale: Center for Exascale Research in Fusion**
 - ◆ CERFing USA
- **FSP is on a respiratory system**
 - ◆ FES: FSP is on pause
- **SciDAC 3**
 - ◆ ASCR institutes solicitation out
 - ◆ There will be Science Application Partnerships (this is where I think FACETS will fit)
 - ◆ Can FACETS help any institute proposals?
- **BAD? GOOD?**



We need to settle on some working groups



Time	Open area	Conf room	Private	
16:00	Next physics problems (Pankin)	Facets-AM/CS/Perf deliverables (Hakim)		
17:00	Dynamic equilibrium (Kruger)	Dashboard and Composer (Alexander)	BOUT++ integration (Hakim, Farley)	UEDGE setup (Pankin, Rognlien)



Schedule is full



- Working lunches, buffet
 - ◆ Today, morning: physics results and needs, recent developments in physics, load balancing
 - ◆ Today, afternoon:
 - ◆ Relaxing dinner
 - ◆ Tomorrow, morning: FSP, dashboards
- Please add your talks with name, PresenterProjectDescriptionDate.ppt (e.g.,
 - ◆ talks/CaryFacetsWinterWelcome23Feb11.ppt



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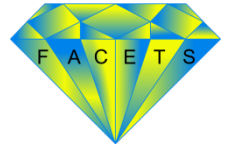


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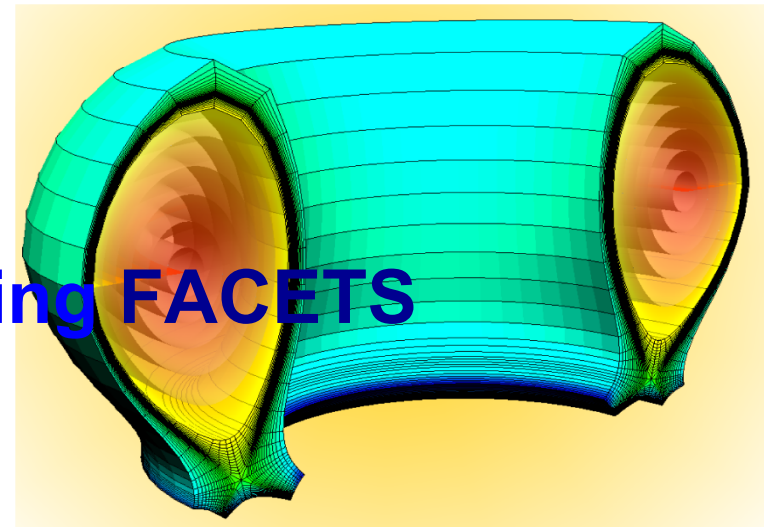


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We are here to help



- **Stephanie Tretter**
 - ◆ food, travel, getting around
 - ◆ quiet space, phone
- **Anne Hammond, Ted Nzuonkwelle, Hiram Bayless: computers**
 - ◆ wireless
 - ◆ logins to iter (FC11-64), multipole (FC9-32 cluster)
 - ◆ svn passwords
 - ◆ webex
- **All Tech-X personnel**
 - ◆ **Access, building, and running FACETS**
- **Dinner**



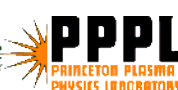
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