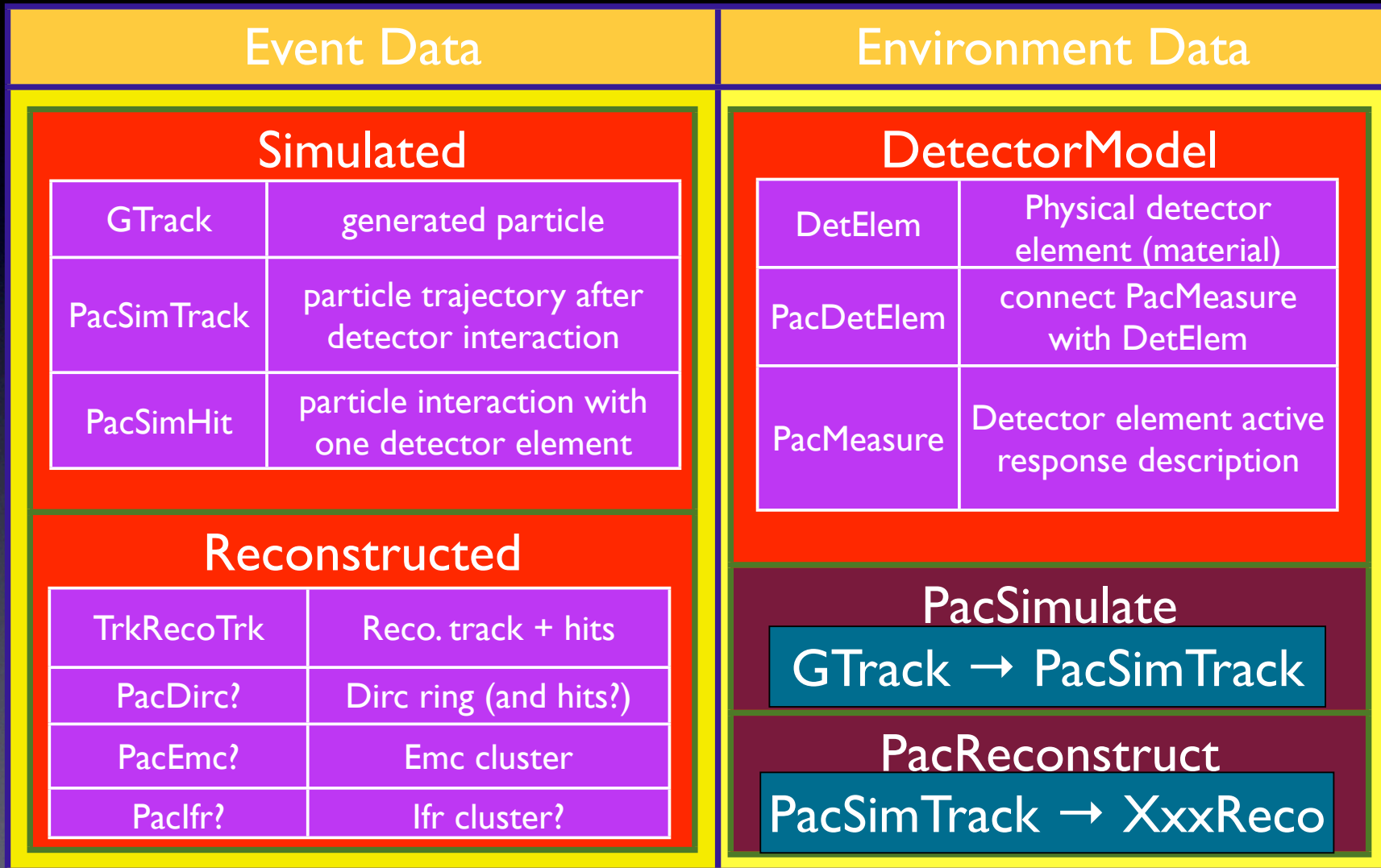


PacTrk Internals

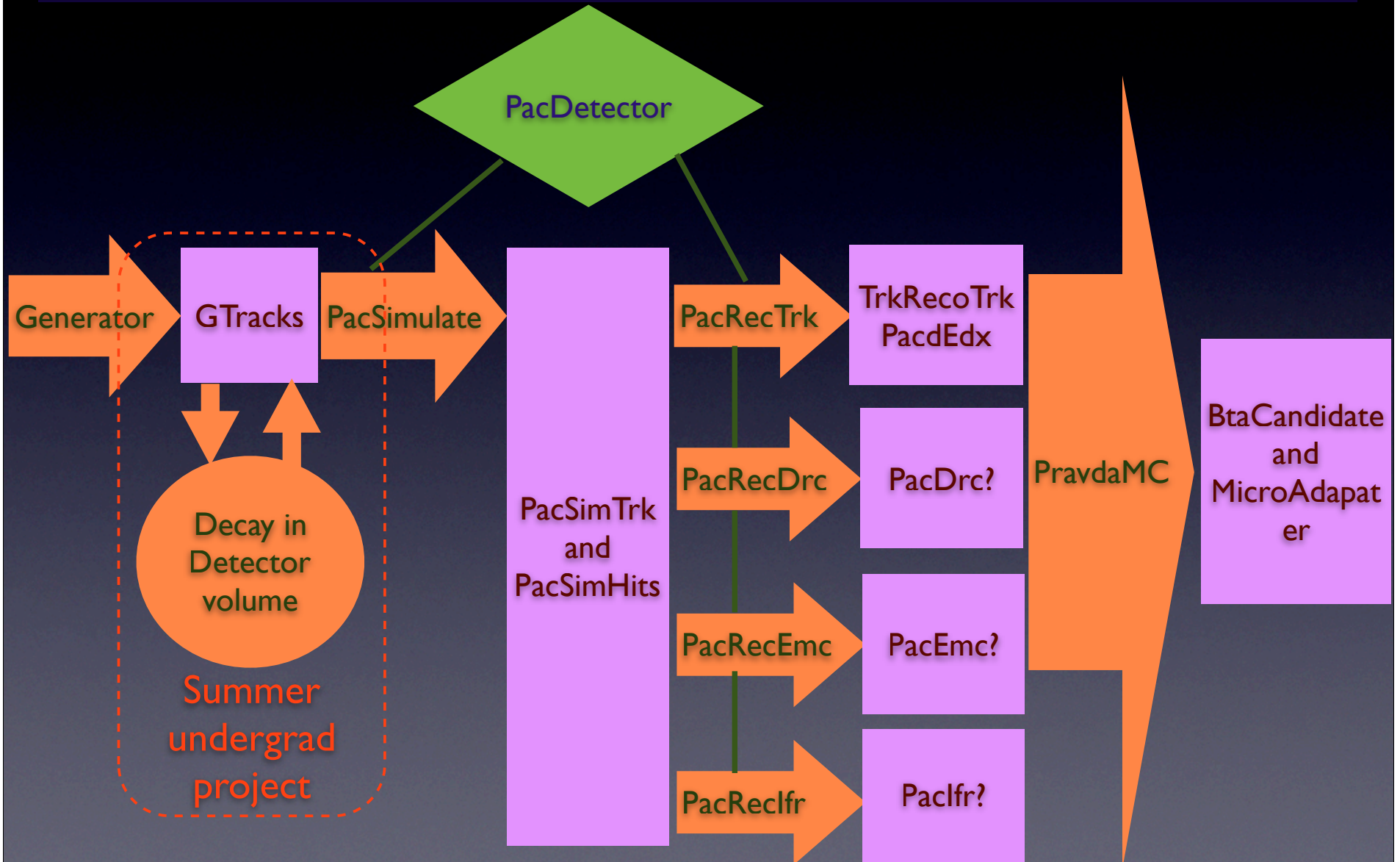
David Brown, LBNL

SuperB meeting 31 May 2008
Elba, Italy

PacTrk Design Overview



Data Flow



PacSimulate

- Model particle through PacDetector elements
 - Scattering and energy-loss at each material of charged **and neutral particles**
 - **Interaction probability, including conversion**
 - Mother particle stops, daughter particles created
 - How to model daughter creation?
 - **Showering probability given X_0 , $N_{\text{interaction}}$**
 - EM and/or Hadronic showers as appropriate
 - Modeled energy loss fraction in material
 - Need a generic longitudinal shower profile
 - Does this overlap physically with the above?
 - **Bremsstrahlung**

PacReconstructXxx

- Convert PacSimTrack to appropriate 'reco' object for detector Xxx
- Provide a common base class?
 - return void* reco object
 - specialize return type in subclasses
 - Provide type key for return type

PacMeasure

- (was PacMeasurement)
- Subclasses describe how active detector element responds to particle passage
- Appropriate subclass Invoked by PacReconstructXxx
 - Looks for PacSimHit with PacDetElem with relevant measurement type in PacSimTrack
 - Returns relevant Xxx reco 'hit' object
 - can be same as Xxx reco object returned by PacReconstructXxx

Detector Configuration

- Controlled by ascii file
 - 'arrays' describing material, geometry, measurement properties of elements
 - Can be easily extended
 - Processed by PacCylDetector constructor
- Replace current format with 'EDML' eventually
- Currently supports only cylindrical elements
 - Extend to include Plane, Cone, other shapes?
 - Requires specializing intersection function

Performance

- 'realistic' BaBar simulation
- EvtGen has very slow 'initialization' routines
 - EvtGen:EvtBtoXsgammaKagan: calculating new hadronic mass spectra. This takes a while...
 - Runs with more events are more efficient

AppAST:	0.00		10000		15.16		1.51600		0.00		IBtaMicroPidKilling
AppAST:	0.00		10000		21.72		2.17200		0.00		IBtuTupleMaker
AppAST:	0.00		10000		15.48		1.54800		0.00		IRacTestInput
AppAST:	0.00		10000		51.88		5.18800		0.00		IPmcReconstruct
AppAST:	0.00		10000		9.81		0.98100		0.00		IPmcSimulate
AppAST:	0.00		10000		107.89		10.78900		0.00		IGllEvtGen

+ ~ 3 msec/event total from other modules
total ~25 msec/event

**100 times faster with specialized
intersection routine**

Package Organization

