

Status of EvtGen Upgrade

- Currently CDF is using a rather old version of EvtGen
 - based on tag V00-09-39-02 from BaBar CVS repository (May 2001)
 - NB: is this really true? README.history would indicate version around V00-09-03 - but perhaps that file wasn't updated?
 - was not an official EvtGen release
 - substantial modifications by CDF
 - were fed back to EvtGen authors (but not all changes may have been included)
- Latest EvtGen releases:
 - alpha-00-11-07, released December 19, 2003
 - expect new release soon (“January 2005”)
 - “private” prerelease version received from David Lange
- Currently working with “private” prerelease - will base actual upgrade on official EvtGen release once available



Why Upgrade?

- Large number of small improvements in latest EvtGen release
 - Tuning of DECA.Y.DEC
 - Decay models
 - Bug fixes
 - Technical issues
- Getting back in sync with current EvtGen will greatly simplify the propagation of improvements (in both directions)
- Helps to address a number of technical issues



From EvtGen's History File (until alpha-00-11-07)

- V00-11-07 : fix 06 public release (trivial)
- V00-11-06 : New public release
 - EvtGen V00-11-06
 - EvtGenModels V00-02-04
 - EvtGenBase V00-02-04

Fix to D->Kspipi dalitz plot CPV model for K*gamma B->lambda pbar gamma
- V00-11-02 : Use with EvtGenBase V00-02-03 and EvtGenModels V00-02-01 for new public release. Noticable physics change is the addition of **corrected D** line shapes via decay table controllable interface.**
- edward-04202003 Add LNUGAMMA description to doc/evt_models.tex and doc/guide.bib. Refers to tag of EvtGenModels edward-04202003.
- V00-10-16 Fix sun compile errors in the tags for V00-10-15. Companion tags: EvtGenBase V00-01-02, EvtGenModels V00-00-15
- V00-10-15 Again - a bunch of changes:
 - o **photos migration to double precision hepevt common**
 - o Eliminated EvtString (std::string)
 - o Rewrite of Dalitz code by Alexei
 - o Eliminated EvtVectorT (std::vector) Companion tags know to work EvtGenBase
- V00-01-01 EvtGenModels V00-00-14
- V00-10-09 Many many changes since last README.history entry. Sorry. Changes include: **Rework lineshape determination SP5 DECAY.DEC revisions to D*, eta, etap, omega, phi production new model for tau->1,2,3pinu.** Compatible tags : EvtGenBase V00-00-16 EvtGenModels V00-00-09
- V00-10-01 Split of EvtGen into 3 packages: user interface: EvtGen, core classes: EvtGenBase, decay models: EvtGenModels
- adv-020405 Massive changes in classes related to Dalitz analyses in preparation for a first release of RooFitDalitz.
- V00-09-48 First release of CPT and PTo3P into nightly
- fmv031902 Fernando M-V. Add **new VSSBMixCPT model (generalization of VSSBMix to include CPT violation in mixing). SSDCP model updated to include CPT violation.** The model has been also debugged/validated for standard CP violation (sin2b).
- V00-09-39-10 Fix the lineshapes for 10 series code (only change is to EvtRelBreitWignerBarrierFact.cc from 10.3.0e tag)
- V00-09-47 Oops - get EvtComplex to compile on Sun.
- V00-09-46 Same as V00-09-45 except it includes the lineshape bug fixes. (K2* and RelBW)
- V00-09-45 New tag for production releases. Contains none of the lineshape bug fixes. Other fixes / migrations are in. Among them are a reduction in the #includes in header files. Also some new tests in testEvtGen – e.g. the track multiplicity distribution
- V00-09-44 Fix lineshape bug in relBW code
- edward-20011012 **Fix bug in amp_util/EvtLNuGamma.cc.** Sign for axial form factor was incorrect in the decays of B-. Sign was correct in decays of B+.
- V00-09-43 Uninit memory read fixed in EvtAmp - SSDCP model updated
- V00-09-42 Standalone version released
- V00-09-41 Move tests for correct # of args/daughters/spins into EvtDecayBase. Add a test to look for specific final states and compute their branching fraction. First release of **EvtSSDCP.cc** model. Still under development. Candidate tag for 11.3.0
- V00-09-40 Add copyright info to each file Convert testEvtGen to ROOT



Comments on Package Structure

- Follows structure in latest EvtGen version
 - to a large extent dictated by form of #include statements in EvtGen source, and by SoftRelTools
- Constrain CDF specific code and data (mostly) to package EvtGen
 - Why not a separate CDF-specific EvtGen interface package?
 - EvtGen contains only doc, test and EvtGen.hh/.cc “main” from distribution
 - Actually would need two separate packages (one on which EvtGen depends, and one depending on EvtGen)
- Minimize changes required to EvtGen distribution during upgrades
 - Try to avoid editing of EvtGen source files except as required for bug fixes (iterating with EvtGen authors on all problems found)
- Requires minimal changes to other CDF packages – so far only:
 - include EvtRandomEngine.hh from EvtGenBase instead of EvtGen



Current Status

- All new EvtGen packages set up in private area
 - Initially imported alpha-00-11-07 release, then switched to prerelease version received from David Lange
 - GNUmakefiles
 - Adapted CDF specific interface code
 - Linking dependencies
- Currently debugging a crash occurring after a few events
- Understanding issues with PHOTOS
 - So far CDF used a private, modified version of PHOTOS with EvtGen
- Dependency on JETSET74
 - Discussing with authors if this is still needed, or if the dependency on Jetset can be removed



Next Steps

- Come to a conclusion regarding JETSET74 and PHOTOS issues
- More checks that EvtGen is working properly together with CDF SW:
 - No conflicts between common blocks
 - Particle codes and properties
 - Single/double precision in interfaces
- Understand all physics changes
 - Determine which CDF developments of EvtGen have not yet been included in the latest EvtGen version
 - Get them included into EvtGen distribution or add as CDF specific code
- Lots of testing
- Improvements
 - Revisit interface code, particle codes and properties, ...



– Physics (baryon decay models, polarization, mixing/CP violation, ...)