

Tracking performance with APEs in local frame

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Introduction

- All APEs stored in global frame
- Reconstruction only uses APEs in local frame
- for each hit APE is transformed from global to local frame
 - *HelpertRecHit2DLocalPos::updateWithAPE*
 - *HelpertRecHit2DLocalPos::parError*
 - *HelpertRecHit2DLocalPos::getKfComponents* (1D & 2D hits)
 - *MuonTransientTrackingRecHit::parametersError* (peanuts)
- All calls look very similar

```
void
HelpertRecHit2DLocalPos::updateWithAPE(LocalError& le, const GeomDet& det) {

    if ( det.alignmentPositionError() != 0 ) {

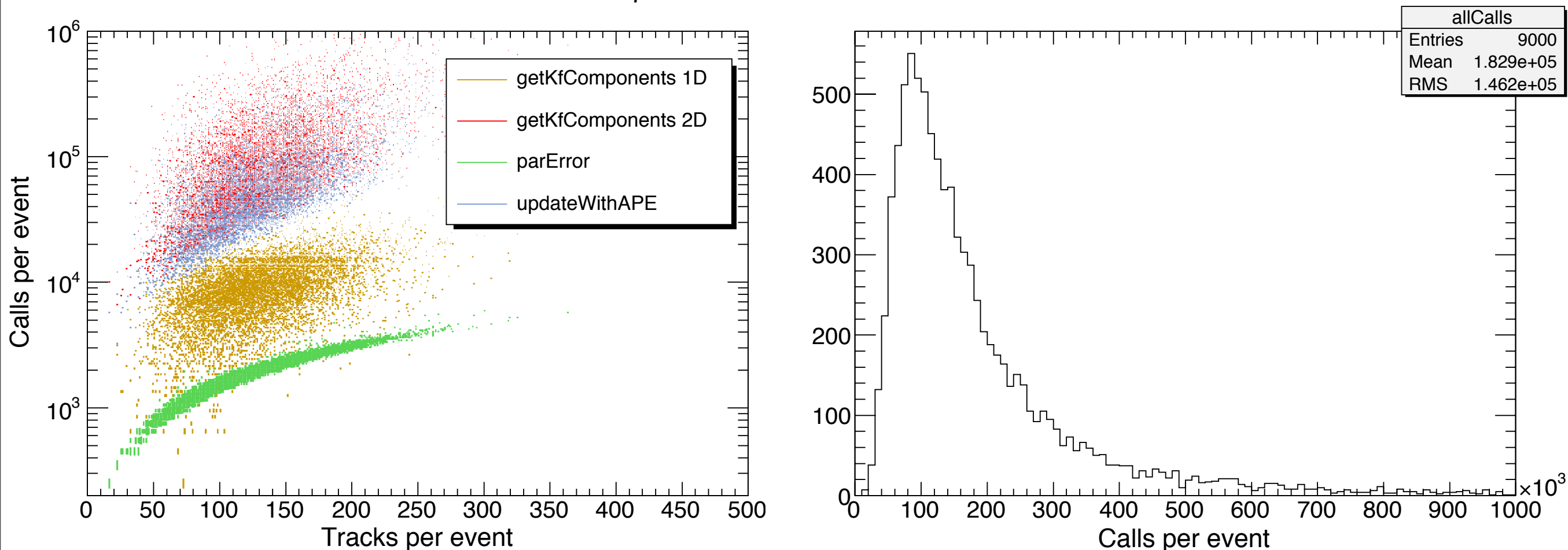
        LocalError lape = ErrorFrameTransformer().transform( det.alignmentPositionError()->globalError(),
                                                                det.surface() );

        ...
    }
}
```

- Single call does not cost too much
 - only multiplications in *ErrorFrameTransformer().transform()*
 - but ...

Test with TTbar RelVal

- Config with *Configuration.StandardSequences.Reconstruction_cff*
 - Can be stripped further?
- 9000 events from */CMSSW_3_5_0_pre3/RelValTTbar/GEN-SIM-DIGI-RAW-HLTDEBUG/STARTUP3X_V15-v1*



- Temporary solution to increase performance implemented
 - Transformation only done once per *DetUnit* and result stored
- Not yet clear how to measure performance increase
 - Need to strip away more stuff from config to reduce bias