The BTeV Electromagnetic Calorimeter *In Situ* Calibration with e^+/e^-

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Calibration Goal/Scenario

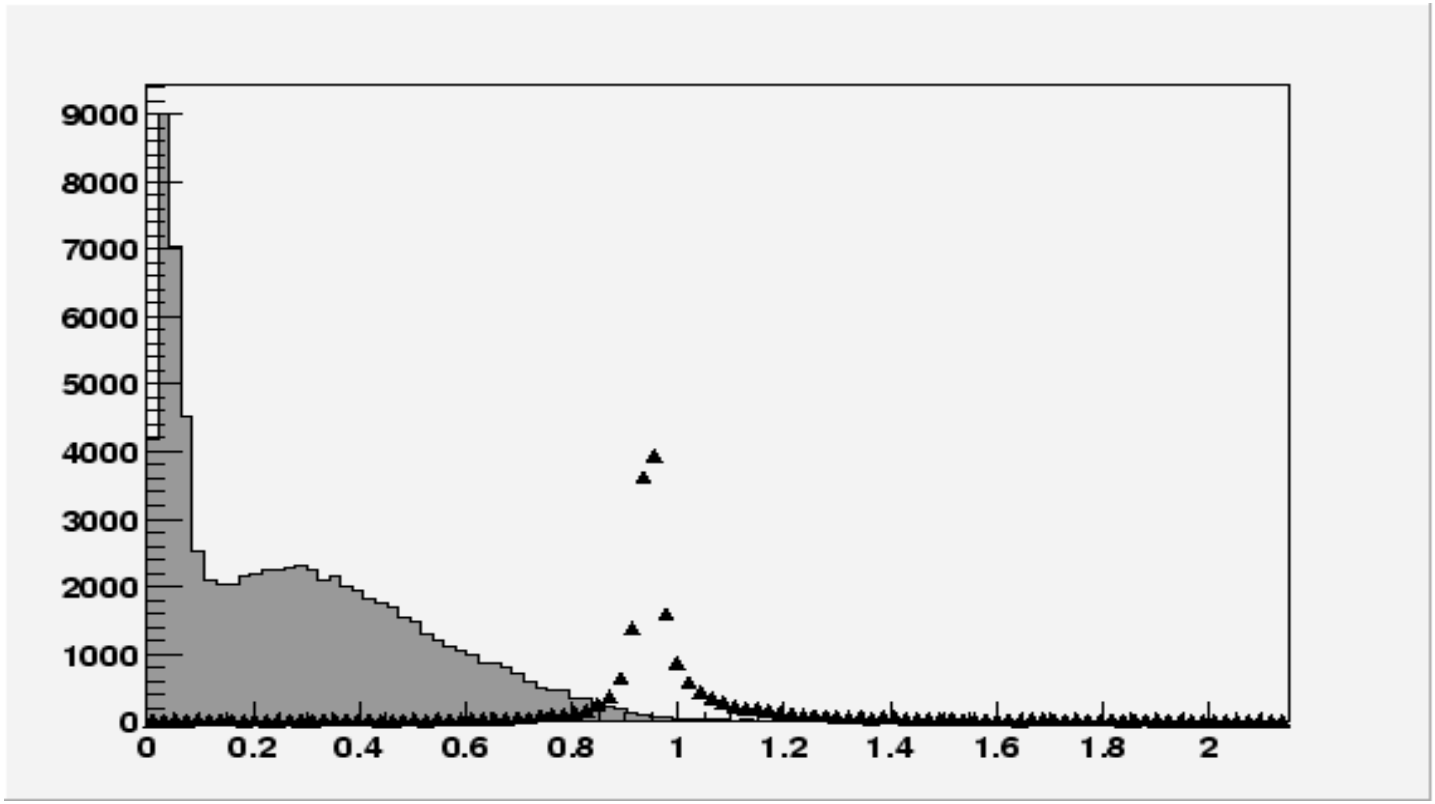
Energy Resolution : $\sigma(E)/E = 1.8\% / \mathrm{sqrt}(E) \oplus 0.55\%$

- All contributions into const term must be kept small
- Calibration precision is the most significant contribution into the const term
- Goal calibration precision 0.2%

- Combined scenario :
  - → *In Situ* + LED-based monitoring
- *In Situ* calibration :
  - → with e^+/e^-
- MC study with 10,000 sample of generic B events

In Situ Calibration with e^+/e^-

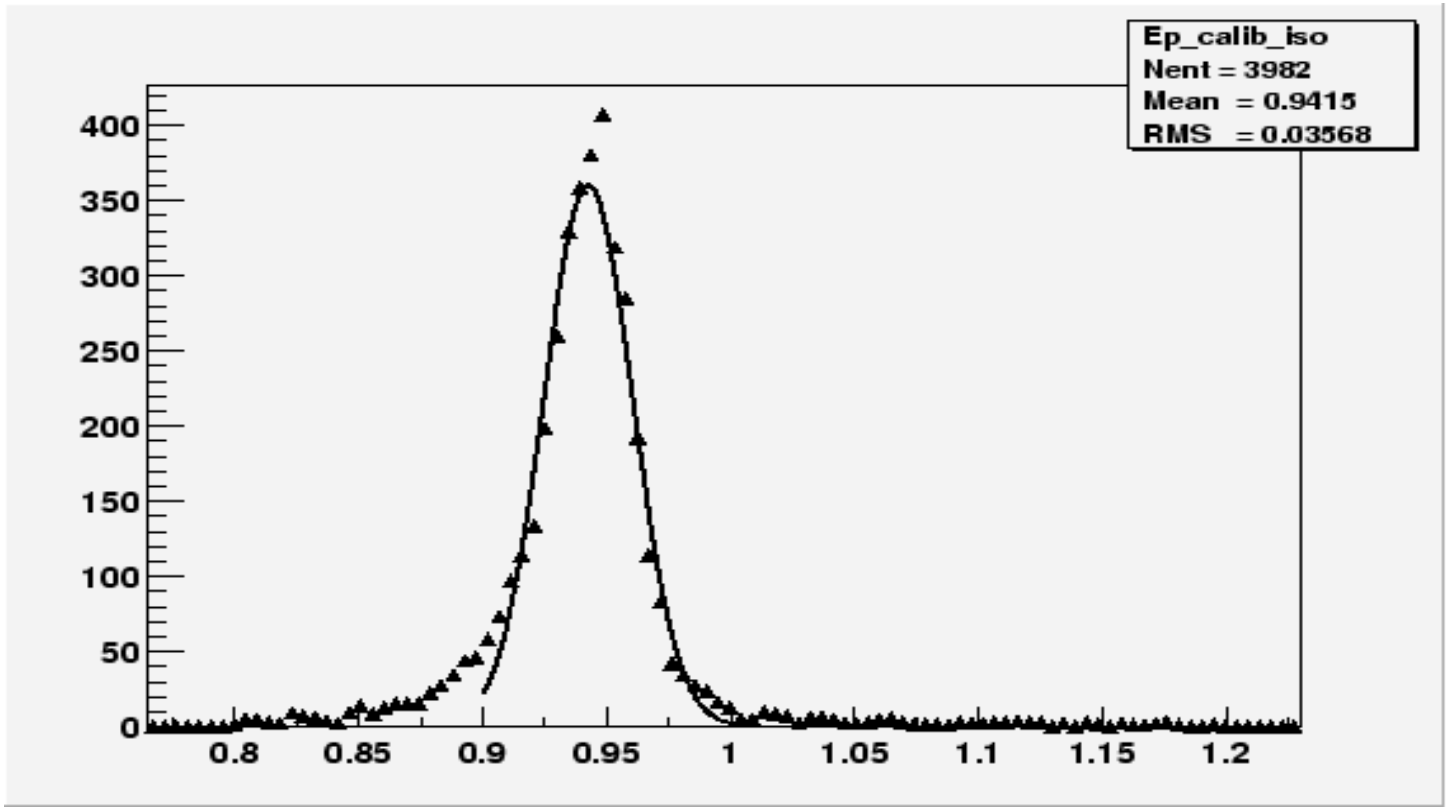
- **Will rely on E/p and use e's rec.momenta to calibrate energy scale**



Measured E/p for e's and for other tracks

In Situ Calibration with e^+/e^-

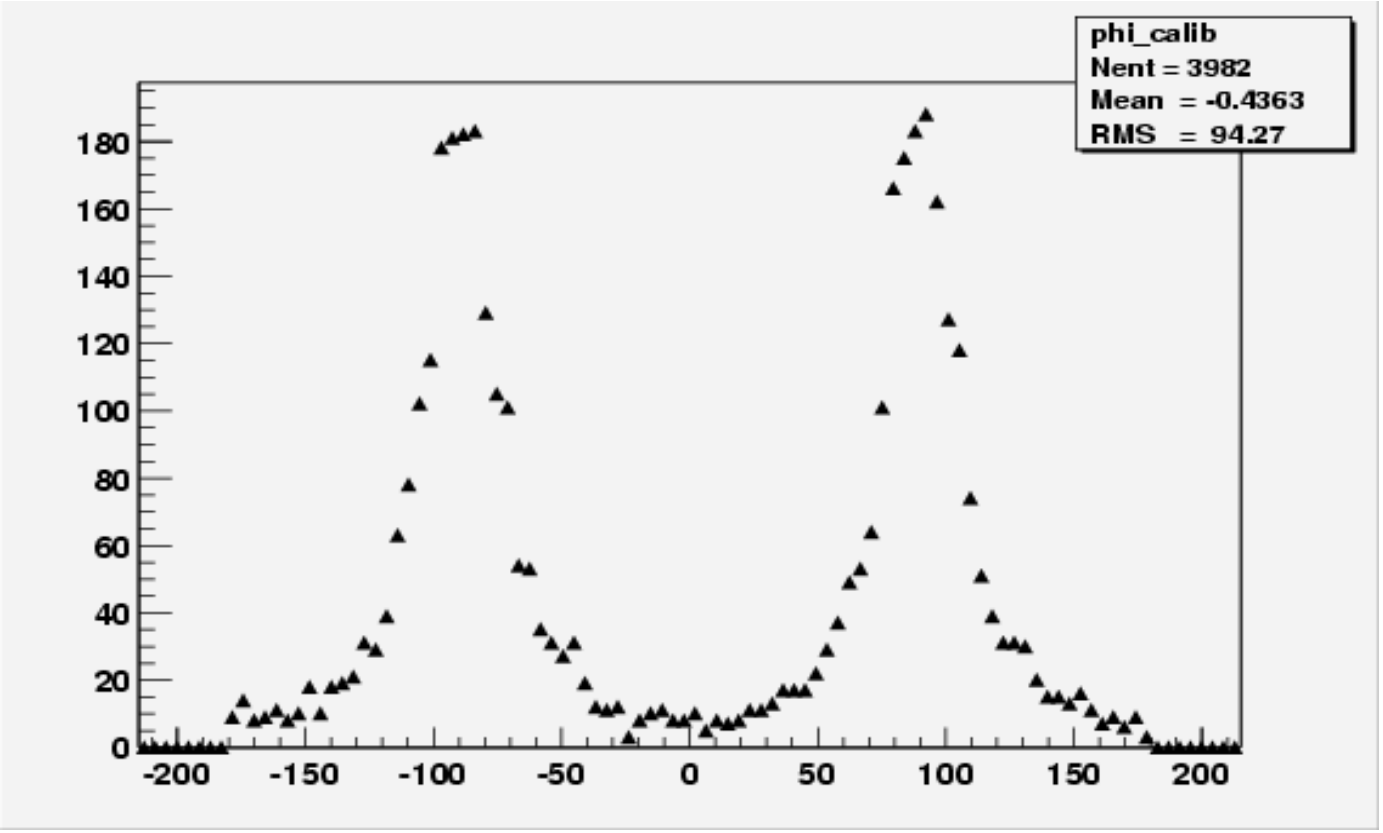
- $\sigma(E/p)$=1.9% (for isolated e's with p>3GeV)
- ~100 e's/crystal to achieve 0.2% precision



Measured E/p for isolated e's

In Situ Calibration with e^+/e^-

- **Significant ϕ-asymmetry due to magnetic field (factor~18-20)**



phi-distribution for isolated e' s

In Situ Calibration with e^+/e^-

- **Collection rate :**
  - **8% - ~1.7e-04 e's/crystal/evt**
  - **14% - ~1.0e-04 e's/crystal/evt**
  - **11% - ~5.0e-04 e's/crystal/evt**
  - **22% - ~2.0e-05 e's/crystal/evt**
  - **45% - $\leq$1.0e-05 e's/crystal/evt**
- **Good news : even the least covered area can be calibrated every several hours of running**

Summary

- MonteCarlo study of the EM Calorimter *In Situ* calibration with particles produced in physics events has been done
- EM calorimeter can be calibrated with e^+/e^- to the 0.2% precision every several hours of running