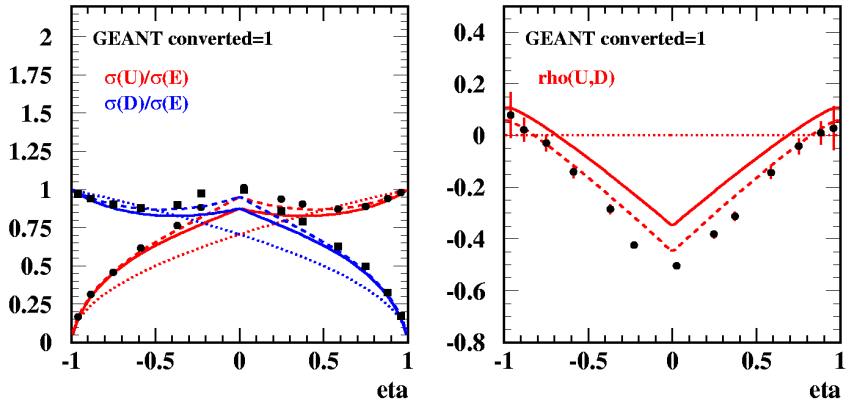
TPOL η resolution studies

- General considerations
- GEANT comapred to testbeam data
- GEANT compared to parametrized response (Status March 3, 2010)

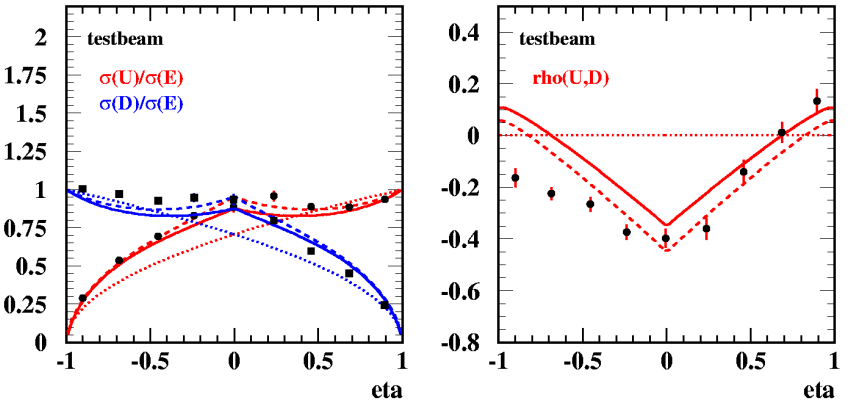
General considerations

- Energy response described by a Gaussian, mean E_0, width σ_E
- For split calorimeter, need mean U_0, D_0 and width σ_U, σ_D and correlation ρ_{UD} as a function of the position
- Relation: $2\,\sigma_U\,\sigma_D\,\rho_{UD} = \sigma_E^2 - \sigma_U^2 - \sigma_D^2$
- Parametrized U_0, D_0, σ_U, σ_D, ρ_{UD} → fast MC
- Last talk: a possible way to parametrize σ_E, σ_U, σ_D as a function of E, η
- This talk: compare GEANT, testbeam data, parametrisation

GEANT wrt testbeam



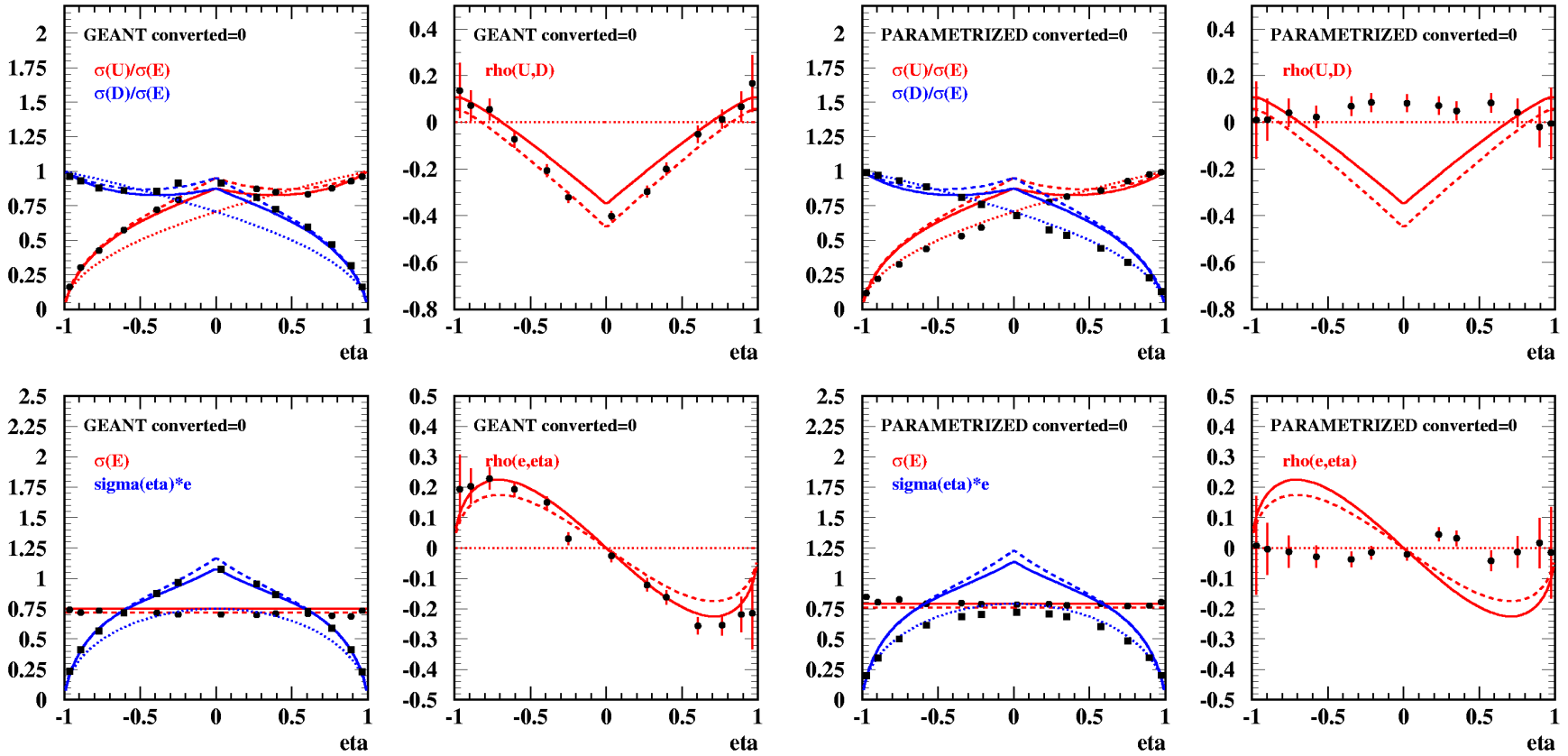
GEANT, converted



Testbeam, positrons, full stat @ 10 GeV

GEANT describes gross features of the data.
Note: testbeam analysis not polished [E-calib, η-y, E(y)]

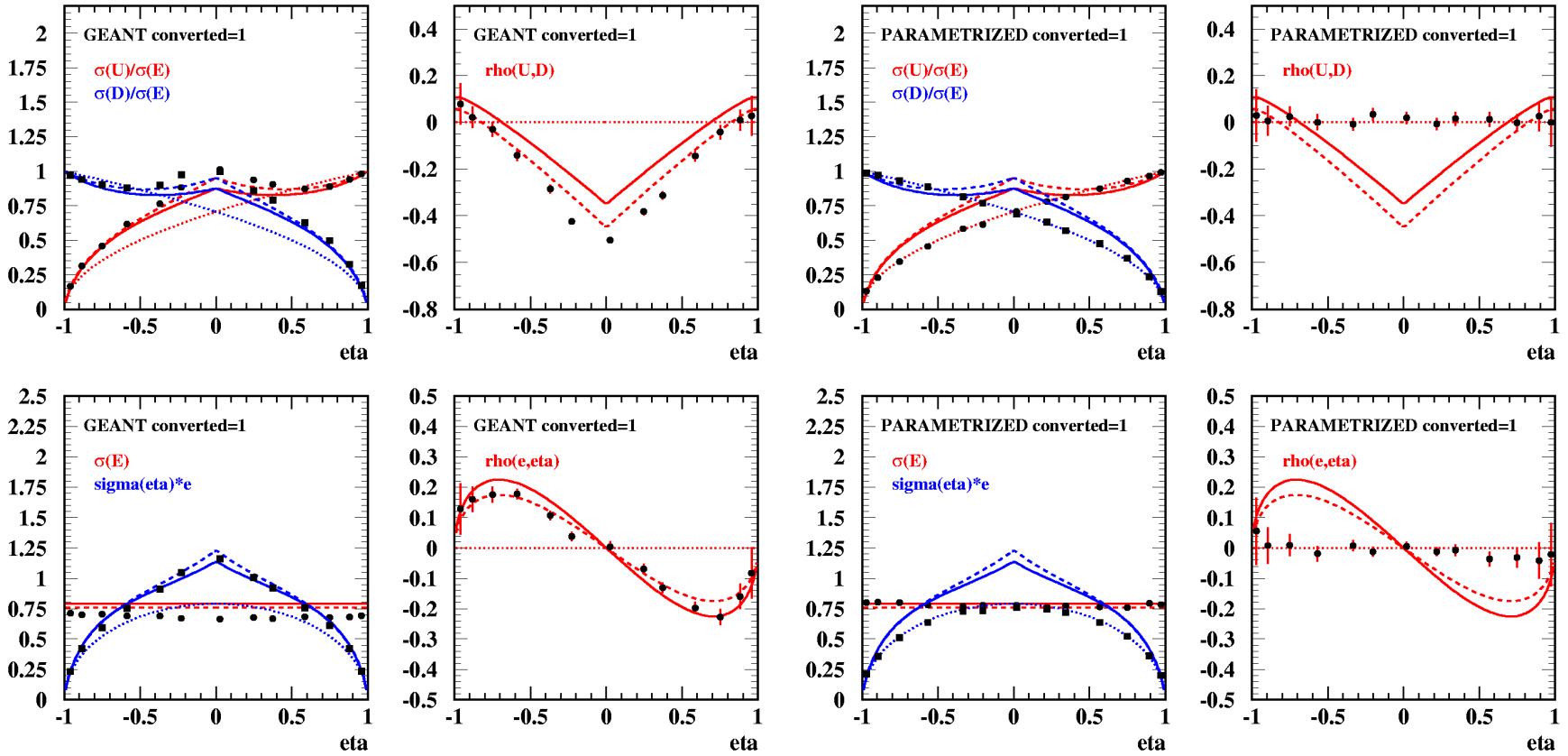
GEANT wrt parametrized (I)



GEANT, non-converted parametrized, non-converted

- GEANT non-converted wrt parametrized non-converted
- UD correlation and E-η correlations not described → η resolution too good in param. MC

GEANT wrt parametrized (II)



GEANT, converted

parametrized, converted

- GEANT converted wrt parametrized converted
- UD correlation and E-η correlations not described→ η resolution too good in param. MC

Proposal

- Add flexible parametrisation of σ_U, σ_D for arbitrary functions $\sigma_E(E,\eta)$, $\rho_{E\eta}(E,\eta)$, $\rho_{UD}(E,\eta)$: moderate modification of the present implementation
- Use existing parametrisation of $\sigma_E(E,\eta)$
- Add basic parametrisation for $\rho_{E\eta}(\eta)$, $\rho_{UD}(\eta)$
- Study systematics effects later (e.g. vary parametrisations bewteen testbeam/GEANT)