Quark Charge Identification

Nicolo de Groot (RAL)

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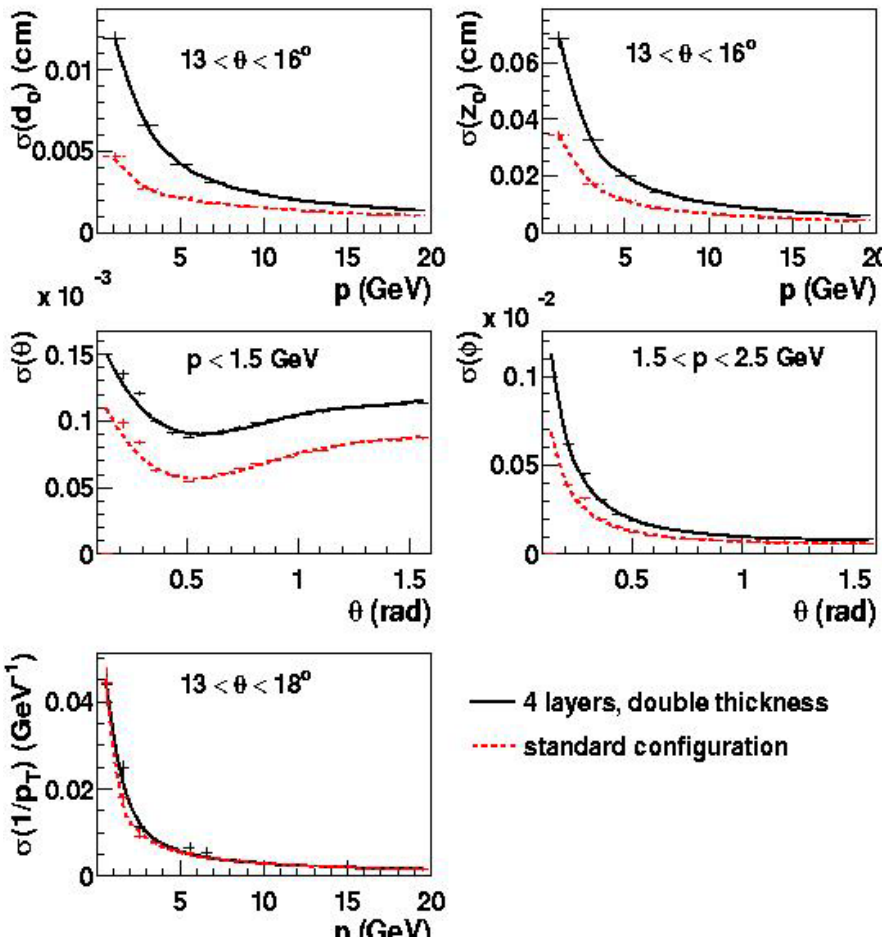
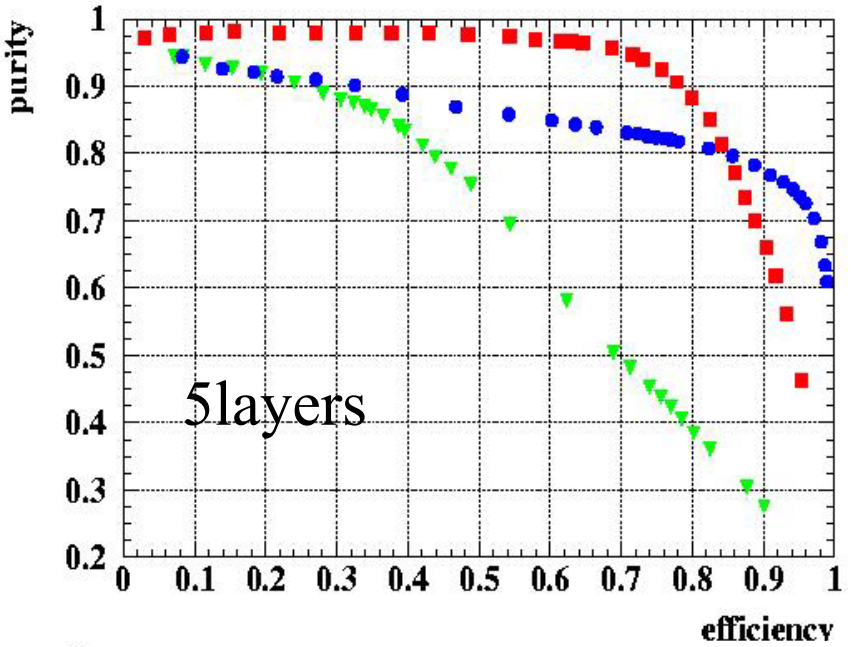
Overview

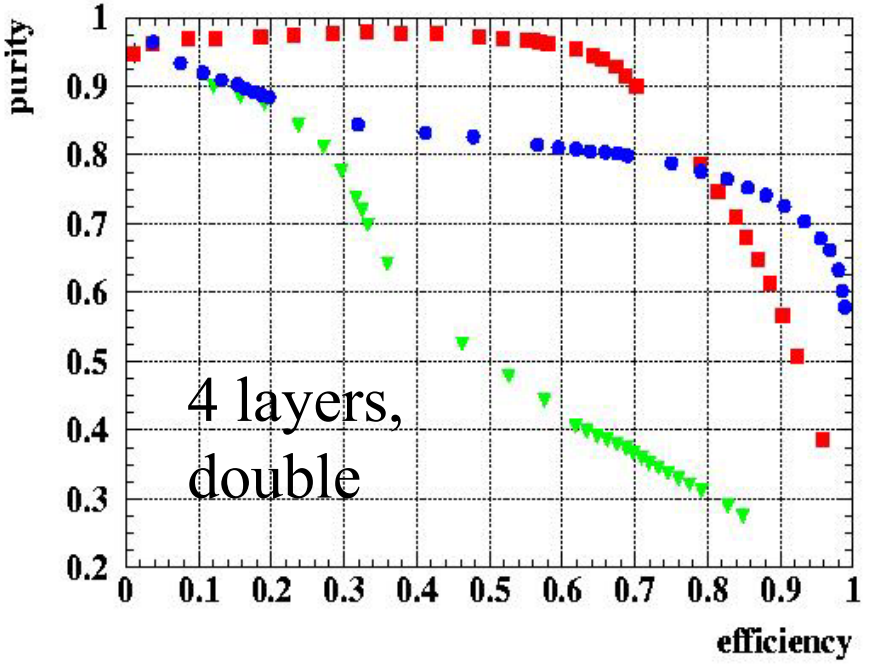
- Reminder Detector configurations
- Improve vertex charge for B's
- Vertex charge for D's
- Dipole
- Plans

Detector Configurations

- 2 configurations, 5 layer single thickness and 4 layer double thickness
- Make single muon and pion tracks for all p's and θ's in Brahms. Fit the distributions
- Include the parametrizations in Simdet
- Biggest effect from removal of the inner layer.





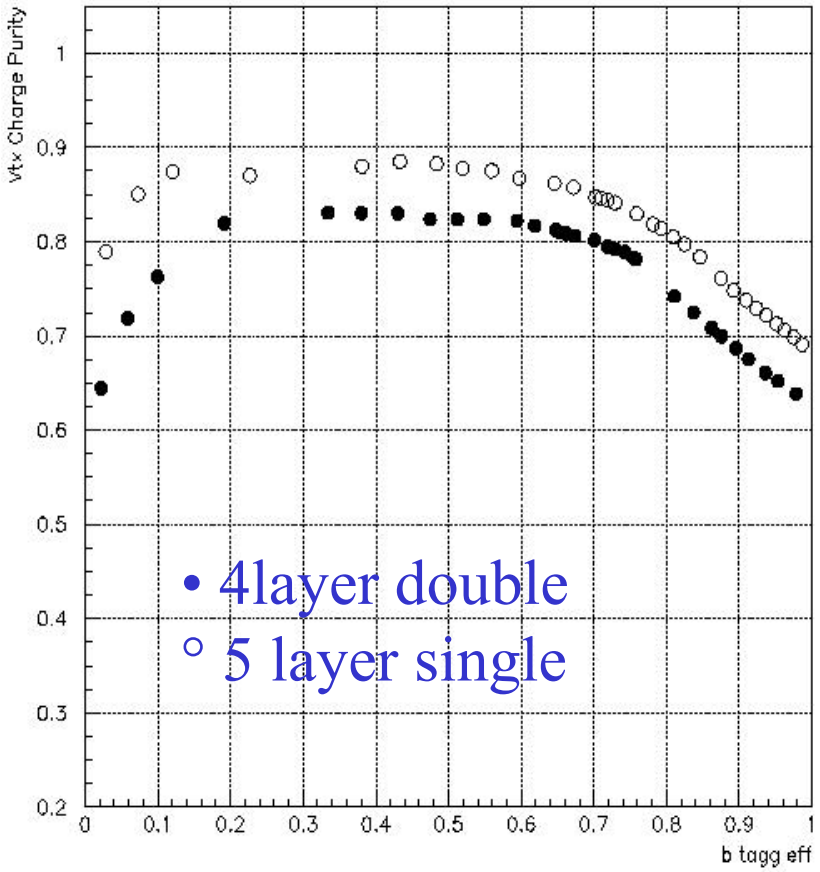


Tagging

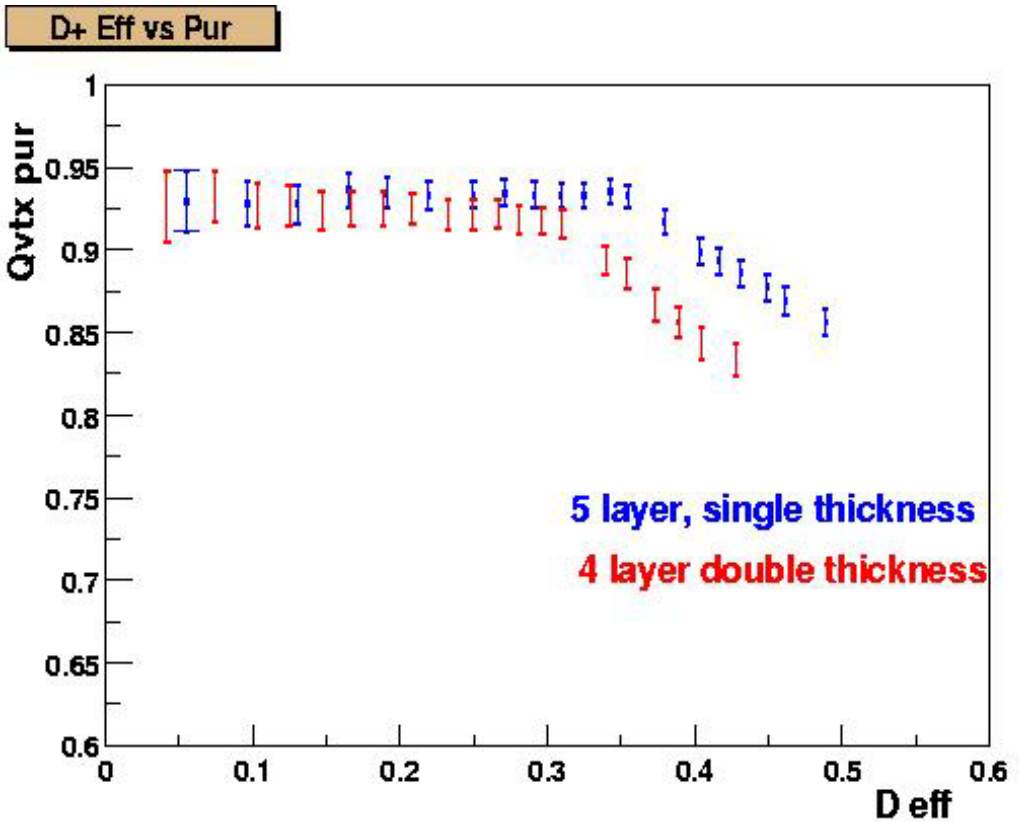
- Clear difference between the configs
- Charm suffers most
- B tagging is easy, charm is hard
- Good agreement between Brahms and Simdet

$B^{\pm}$ Vertex charge

- Different approach from SLD, examine all tracks (SLD unattached only)
- For charged B's that have a secondary vertex, up to 90% give the correct charge
- This drops by 6-8% for the 4 layer double thickness config
- Note: qvtx = 0 counts as wrong charge assignment
- χ_{eff} = 0.069



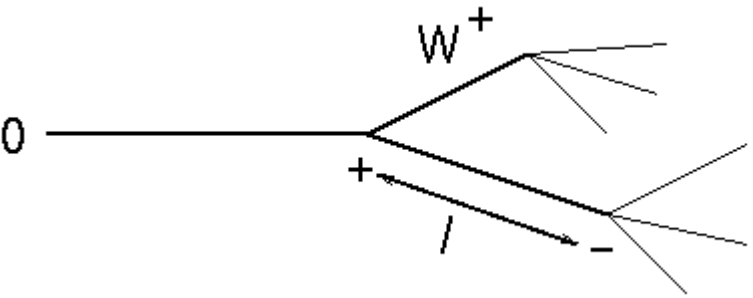
Charged D vertex charge



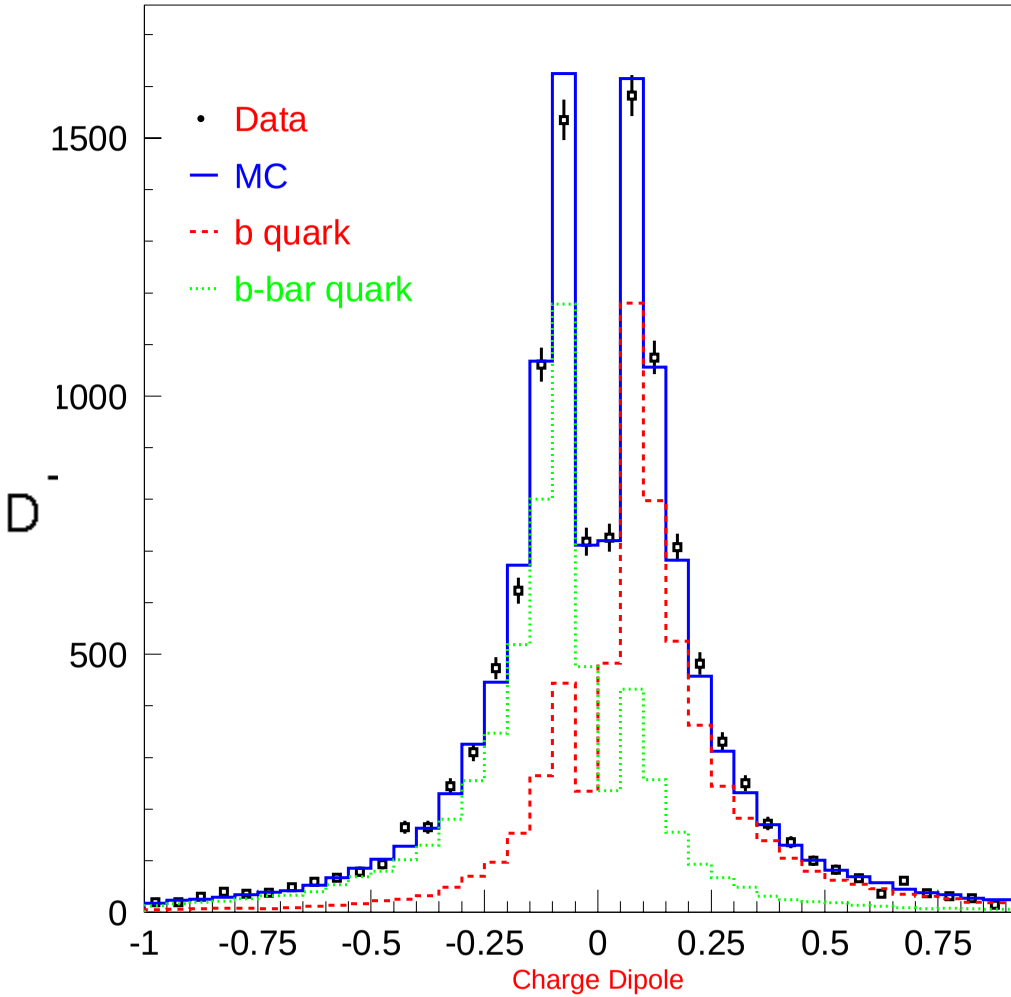
- Excellent purity !
- Less of a difference between configs
- B vtx charge is hard, D is easy

Vertex Dipole in SLD

- Use decay chain for B^0 and B_s



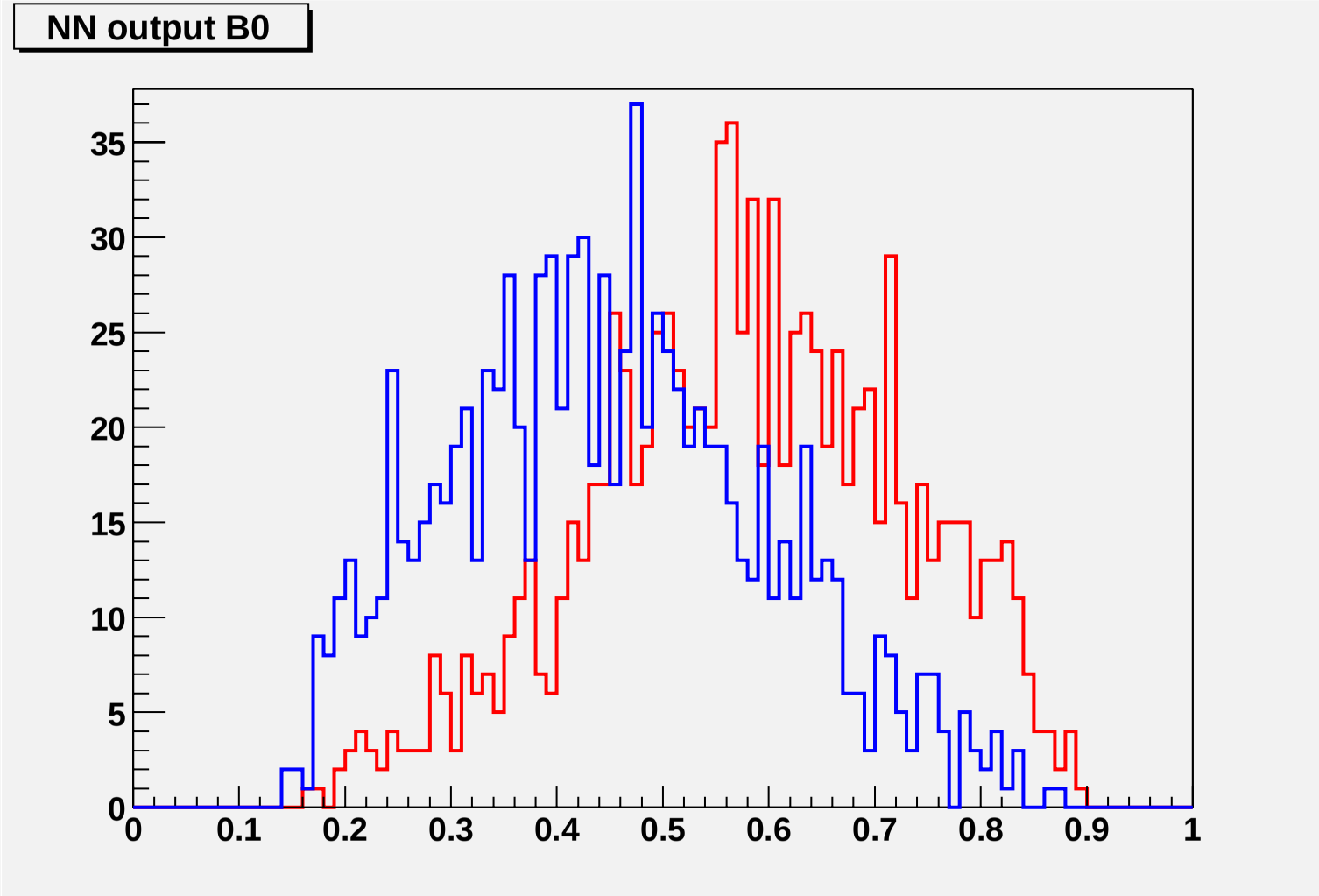
- Typically 78% correct
- Size of dipole is measure of the purity



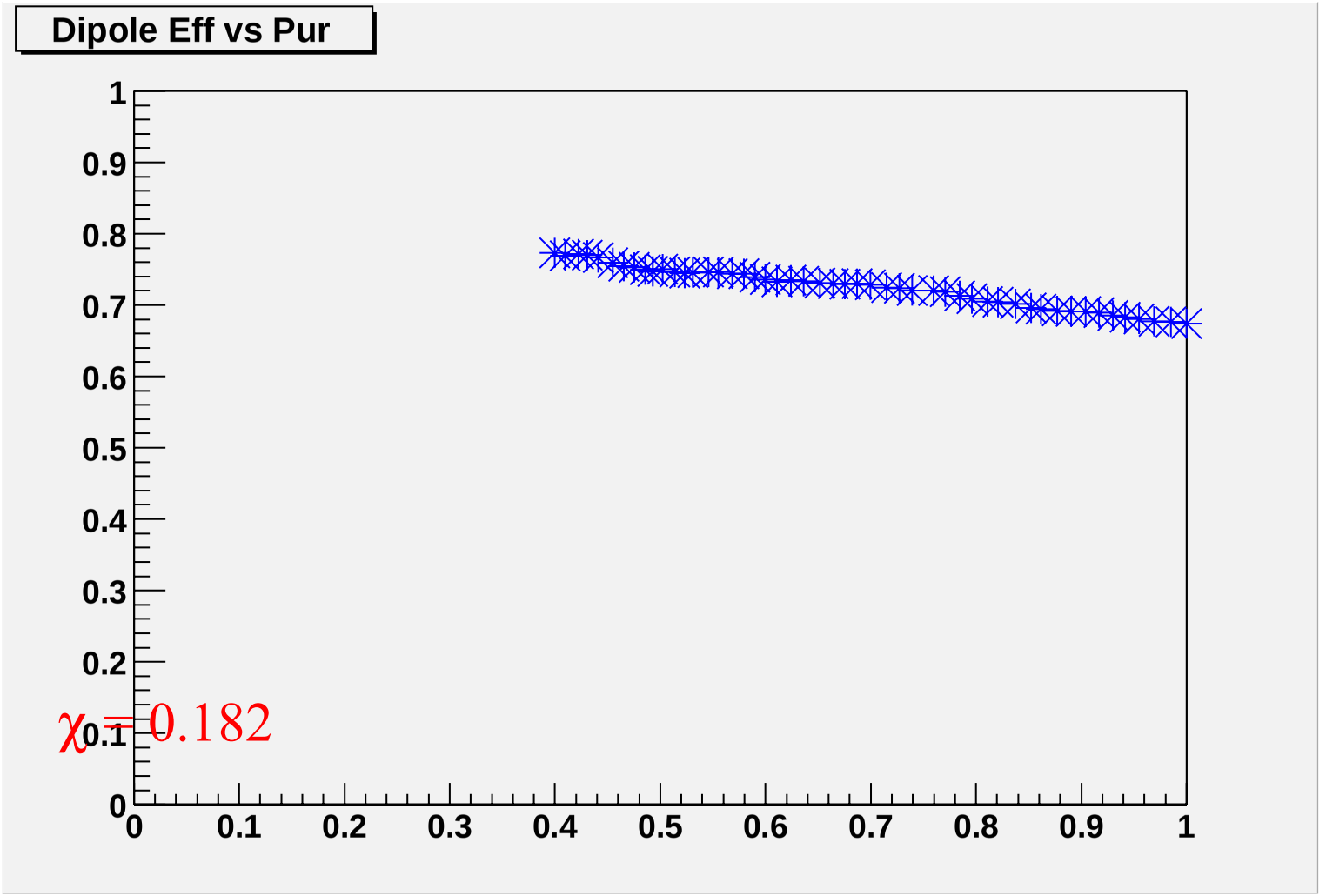
Dipole Method

- Neural Network (www.slac.stanford.edu/~nicolo/TMlpNet)
- SLD Dipole like variables (L/D weighted charge)
- Jet charge like variables (Longitudinal momentum weighted charge)
- And combinations
- Only use tracks that are attached to the secondary vertex by the vertex charge procedure

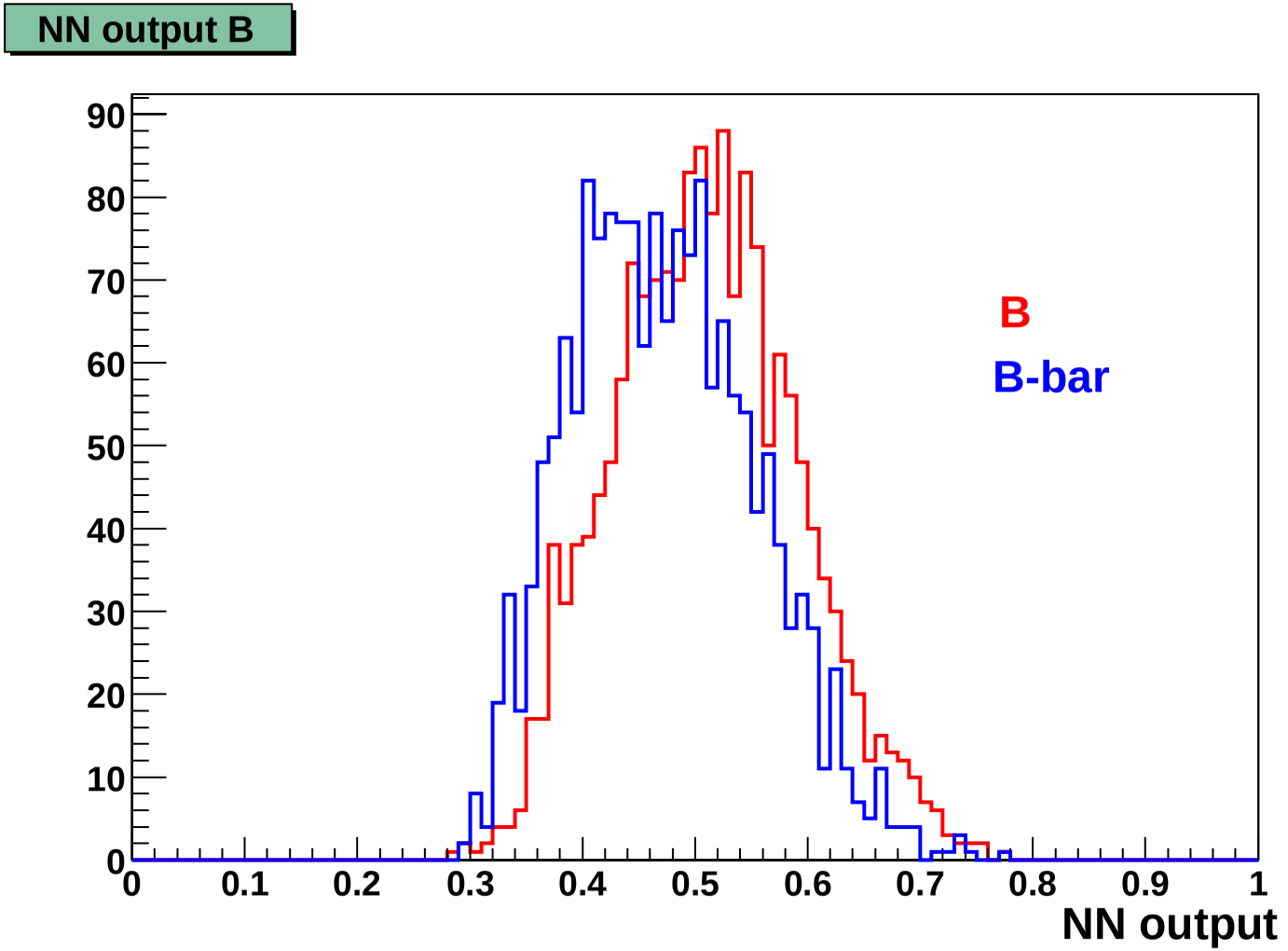
B0 dipole



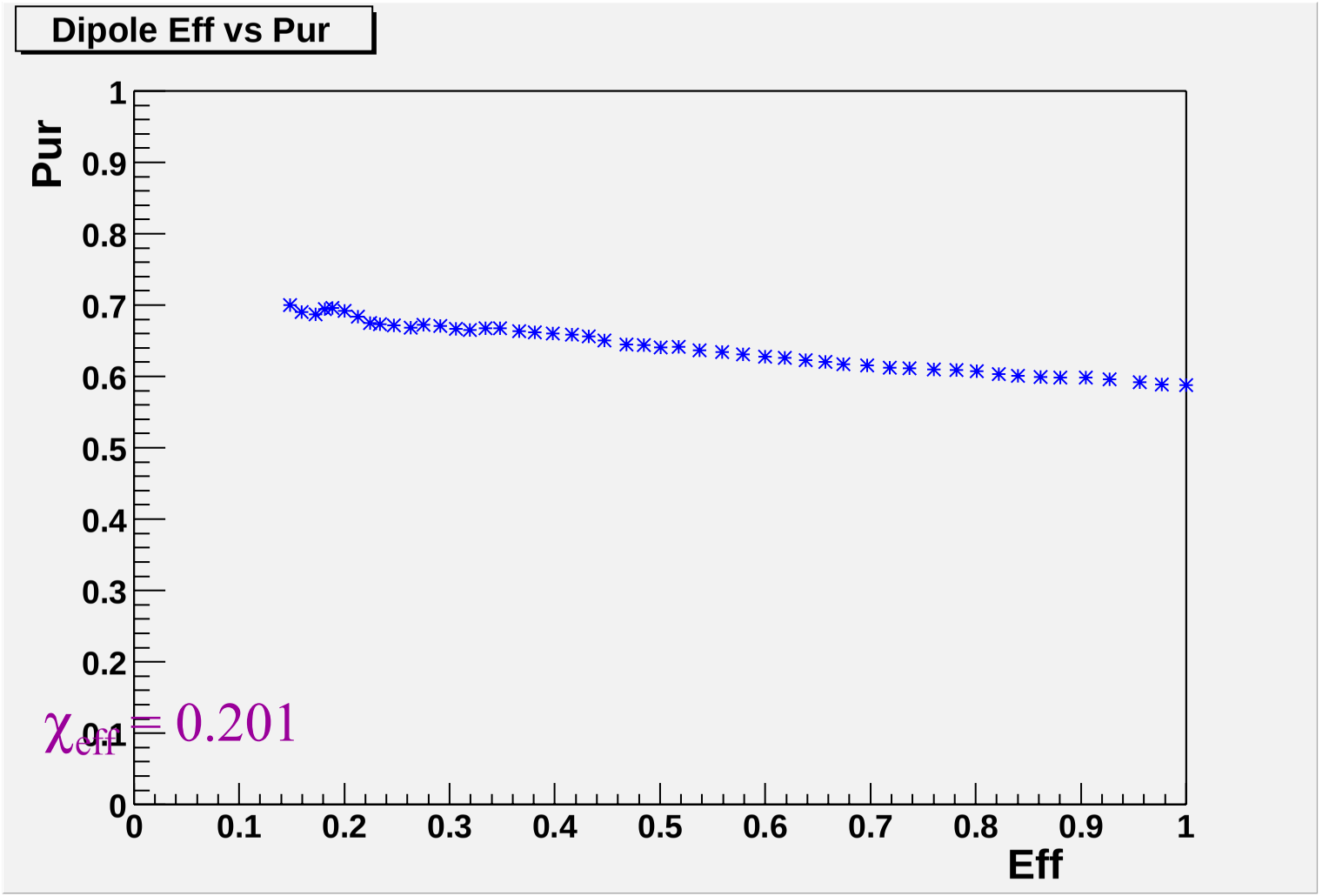
B0 dipole Eff vs Pur



All neutral vertices



Dipole Eff vs Pur



Plans, conclusions

- Vertex charge, 50% efficient, 88% pure.
- Dipole for the rest, up to 70% pure (max 80%)
- Leptons ?
- Slow-π's ?
- Write-up ?
- Package ?