Vertex fit Event time

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Vertex resolution

Event time left free in the fit

Reconstructing MC hits:

- Fitted time should be at t=0 (true event time)
- Fit started at t=0 and true neutrino vertex position

What happens to the resolution when t is fixed at different values?





Best resolution obtained -3 < t < -2

3

Vertex resolution **Time fixed at different times**

- Ambiguity between fitted time and longitudinal resolution
- t=o does not yield the best resolution

Archeology by Dorothea: Robert also found an energy dependent reconstructed time

Can I reproduce this in the toy MC?



(b) Time resolution vs simulated neu-(c) Time resolution vs simulated neutrino energy for nueCC single trino energy for tauCCshow events shower events



Toy MC

- Generate a shower event ($E_{\nu} = 100 \text{ TeV}$)
- Fit the vertex for different fixed times (-4, 4)

No longitudinal bias at t=0 AND best perpendicular resolution

Is there something in our MC that favours earlier event times?



Perpendicular vertex resolution



Longitudinal vertex resolution

