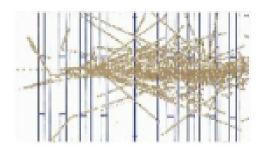
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Electromagnatic shower reconstruction with emulsion films in the OPERA experiment

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Summary

OPERA is a long-baseline neutrino oscillation appearance experiment designed to obtain an unambiguous signature of $\nu_{\mu} \rightarrow \nu_{\tau}$ oscillation. The detector, located in the underground Gran Sasso Laboratories, plans to detect ν_{τ} 's in the CERN to Gran Sasso (CNGS) ν_{μ} beam. which is optimised for ν_{τ} appearance. OPERA is an hybrid experiment with electronic detectors, iron magnets and Emulsion Cloud Chambers (ECC). The ECC combines in one cell the high tracking precision of nuclear emulsions ($\sim 0.1 \ \mu m$) and the large target mass of the lead plates. The basic element, the "brick", has dimensions of $12.7 \times 10.2 \times 7.5$ cm³; it is a sequence of 56 lead (1 mm thick) and 57 emulsion films (44 μ m thick emulsion layers on either side of a 205 μ m plastic base). The total length of an OPERA ECC module is about 10 X_0 . In addition of its very good tracking information capabiliy, allowing for instance the detection of short-lived particles, the ECC can be used as a fine sampling electromagnetic calorimeter. We will report the method developped to reconstruct the electromagnetic showers with ECC and the energy measurement in the 1-10 GeV range. The achieved energy resolution is about $\frac{\sigma_E}{E} = \frac{40\%}{\sqrt{(E)}}$. We will also present the momentum measurement of the charged hadron using Mutiple Coulomb Scattering used for the

hadronic shower reconstruction.

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