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Emulsion Technique for High Resolution Muography

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Nuclear emulsion detector is employed in three-dimensional charged particle detectors that have sub-micron position resolution over 1 m² with no dead space and no dead time. It has excellent portability, very good cost performance, and doesn't need power supply. These features are quite suitable for Muography.

Nuclear emulsion start to store the all track of the charged particle passed through it from when it poured. Therefore when we start to observe muon, two emulsion plates should be attached. By using the coincidence between these two emulsion plates we can distinguish the muons during the observation period.

The trajectories of charged particle which passed through emulsion layers are detected by a fully automated emulsion readout system. These systems have been developed for neutrino physics. The readout speed became 72cm²/hour/system in 2007. Now four such systems are running almost fully for neutrino experiments "OPERA". The readout system will be reach to 121cm²/hour/system soon easily just changing the objective lens magnitude (x35 to x25).

The feature of nuclear emulsion, modern readout system, the past observation for the investigation of Mt. Asama, Mt.Showa-shinzan, and the future plan will be presented in this talk.