# A POSSIBLE EAS ARRAY ABOVE THE SOUDAN II DETECTOR

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## ABSTRACT

Multiple high energy muons, when studied with a large area detector, can be useful in the study of the composition of Cosmic Rays at energies ~10**14 eV. The Soudan II detector, primarily designed to detect nucleon decay, is located ~600 m deep underground and has dimensions 16m X 8m X 5m(height), and is made up of drift tubes. The minimum muon energy needed to penetrate that depth is ≈500 GeV.

We have used a set of simulated EAS to calculate the rate of muon associated events, using a trigger array with the number of detectors varying from 37 to 127 ( the radius of acceptance varying from 50m to 100m). The number of simulated showers, initiated by different nucleii(mass A) used in the calculations, is given in the following table.

| A | $E_o \geq$ : 50 Tev | 100 Tev | 400 Tev | 1600 Tev |
|---|---|---|---|---|
| 1 | 711 | 917 | 711 | - |
| 4 | - | 306 | 1100 | - |
| 14 | - | - | 686 | 120 |
| 24 | - | - | 629 | 149 |
| 56 | - | - | 1100 | 88 |

The assosciation rate is seen to be a strong function of the multiplicity of muons in the detector. The difference in the rates of association of proton and nucleii induced showers rises rapidly with multiplicity. More detailed decoherence studies, which is possible with this high resolution detector, and correlation with shower chartacteristics is under progress.
Flux considerations dictate that a minimum radius of 100m for the EAS array is essential for the method to be useful.