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SHINE-NA61 experiment and applications for neutrino fluxes and cosmic rays

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Large uncertainties in neutrino beam fluxes as well as for the prediction of extended air showers come from poor knowledge of the production of mesons in hadronic interactions on Carbon or atmospheric gas.

The NA61 experiment at the CERN SPS measures hadron production from collisions of pions, protons and ions on different types of targets. Its acceptance is up to 500 mrad. The particle identification and tracking are performed by dE/dx in large TPCs and TOF detectors. In 2009, an upgrade of the DAQ increased the aquisition rate until 100 Hz. The Forward TOF detector has also been enlarged, covering an extended domain.

The NA61 experiment enables to reproduce the interactions of the neutrino experiment T2K and cosmic rays experiments Auger and KASKADE. To reproduce the T2K beam, a replica of the carbon target has been exposed to SPS protons at the same energy (30 GeV), as well than a thin target dedicated to primary interactions. NA61 measured also h+C interactions at 158 GeV/c and 300 GeV/c needed for the reconstruction of the cosmic rays events of Auger and KASKADE experiments. In both case, the resolutions of these experiments will improve substantially.

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