Antineutrinos in MINOS

The MINOS experiment has just released its first beam results which study the disappearance of muon neutrinos as they travel from Fermilab to the Soudan Mine, in Minnesota. But the NuMI neutrino beam aimed at the magnetized MINOS detectors is not uniquely composed of neutrinos but also of about 7% of antineutrinos. An antineutrino oscillation analysis constitutes a direct test of CPT conservation in the neutrino sector, and the reach of such an analysis in MINOS was studied. It was found that only about 1e20 protons on target of reversed horn current running are needed to completely exclude the CPT violation interpretation of the LSND anomaly and constrain $\overline{\Delta m^2}$ with a precision that rivals the current best measurements of the atmospheric Δm^2.

In addition, this work on antineutrinos has found an application in the ν_e appearance analysis. By tagging antineutrinos originated from μ^+ decays it is possible to make a measurement of the intrinsic beam ν_e background. A preliminary result is expected by the summer.