**Use of advanced genetic algorithms in design of high intensity muon sources**

**Abstract:**

The production process of pions which then decay into muons yields muon beam with large transverse and longitudinal emittances. Such beam requires phase space manipulation to reduce the total 6D emittance before it could go through any acceleration stage. The design of the muon beam manipulation is based on Neutrino Factory front end design.

 In this study we report on a multi objective - multivariable genetic global optimization of the muon front end using parallel genetic algorithm. The parallel optimization algorithm and the optimization strategy will be discussed and the optimized results will be presented as well.

**Summary:**