

# COLLOQUIUM

## **Muon collider feasibility: new studies of a low emittance muon source using positron beam**

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The idea of a muon collider is intriguing physicists because it would give the possibility to explore phenomena in the multi-TeV energy region colliding point-like particles. The study of a muon accelerator with a hadronic muon source, ie muons coming from pion and kaon decays, has been pursued showing limitations due to the broad momentum and angular spectra of the decay muons. A new source of a muon beam is proposed. When a positron beam of about 45 GeV energy interacts with fixed target electrons, the center of mass energy is just above the di-muon production threshold and the emerging muon beams have low emittance. This fascinating idea is challenging and needs extensive studies and tests to verify it could be utilized. Proposed by INFN, the approach to realize this idea will be presented including such critical aspects as the positron source simulation, the target choice, and the muons production. Preliminary results obtained during the first test beam studies performed at CERN during summer of 2017 will also be presented.