



Contribution ID: 70

Type: **not specified**

## Suppression of the longitudinal coupled bunch instability in DAFNE in collisions with a crossing angle

*Tuesday 24 September 2019 18:50 (20 minutes)*

In DAFNE, the Frascati  $e^+/e^-$  collider operating since 1998, an innovative collision scheme, the crab waist, has been successfully implemented during the years 2008-09. During operations for the Siddharta experiment an unusual synchrotron oscillation damping effect induced by beam-beam collisions has been observed. Indeed, when the longitudinal feedback is off, the positron beam becomes unstable with currents above 200–300 mA due to coupled bunch instability. The longitudinal instability is damped by colliding the positron beam with a high current electron beam (of the order of 2 A) and a shift of about -600 Hz in the residual synchrotron sidebands is observed. Precise measurements have been performed by using both a commercial spectrum analyzer and the diagnostic capabilities of the longitudinal bunch-by-bunch feedback. The damping effect has been observed in DAFNE for the first time during collisions with the crab waist scheme. Our explanation, based both on theoretical consideration and modeling simulation, is that beam collisions with a large crossing angle produce longitudinal tune shift and spread, providing Landau damping of synchrotron oscillations.

**Author:** DRAGO, Alessandro (INFN)

**Co-authors:** ZOBOV, Mikhail; SHATILOV, Dmitry (Budker Institute of Nuclear Physics (RU)); RAIMONDI, Pantaleo (ESRF)

**Presenter:** DRAGO, Alessandro (INFN)

**Session Classification:** Session 3