



Canadian Association
of Physicists

Association canadienne
des physiciens et physiciennes

Contribution ID: 2537 Type: **Poster Competition (Graduate Student) / Compétition affiches (Étudiant(e) 2e ou 3e cycle)**

76 - Measurement of SuperKEKB Electron Beam Polarization through Tau Forward-Backward Polarization Asymmetry

Tuesday, 4 June 2019 17:19 (2 minutes)

Presently the Belle II experiment at SuperKEKB is colliding e^+e^- beams at the $\Upsilon(4S)$ resonance. These beams currently have no polarization, but if SuperKEKB and Belle II were to be upgraded to make use of polarized electron beams a significant number of electroweak precision measurements could be made. However, in addition to the technical difficulties in creating a polarized beam for collisions, it is difficult to know the exact amount of polarization that remains at the moment of collision. This uncertainty can become a leading systematic uncertainty limiting the precision of physics measurements.

The beam polarization can be measured with sub-percent precision by making use of the relationship between beam polarization and the forward-backward asymmetry in the polarization of tau leptons produced in the e^+e^- collisions. By measuring the asymmetry, a precise value for the beam polarization at the e^+e^- interaction point can be determined.

In this talk I will show results from applying this analysis method to the unpolarized beams delivered by SLAC to the BaBar experiment. I will also discuss the feasibility of applying the analysis technique as a measurement tool of beam polarization for a potential upgrade of polarized electron beams to SuperKEKB/Belle II.

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Session Classification: PPD Poster Session & Student Poster Competition Finals (26) | Session d'affiches PPD et finales du concours d'affiches étudiantes (26)

Track Classification: Particle Physics / Physique des particules (PPD)