

# **Spontaneous electron beam polarization and its application on Storage Rings**

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Synchrotron radiation on the electron storage ring can flip the electron spin, the asymmetric spin flip rate can make the beam naturally polarized. This property of the electron beam can be used to measure the average electron beam energy with an accuracy of a few  $10^{-5}$ . In this talk, using SOLEIL storage ring as an example, the electron spin dynamics is tracked using the simulation code SLIM (Spin Linear Transfer Matrix), then the equilibrium polarization level and characteristic polarization time are obtained. The spontaneous polarization is measured using Touschek beam lifetime since the cross section of intra-beam scattering depends on beam polarization. Finally, the experiments to measure the electron beam energy using spin depolarization method are demonstrated and discussed.