

1 Perturbation of the spin motion

The spin precession axis of a particle involved in betatron motion precesses about the invariant spin axis defined on the closed orbit.

This precession can be observed in polarization data as a rapid, small-amplitude oscillation on top of the *major effect* oscillation, which is caused by the spin precession about the invariant spin axis defined for the closed orbit (see Figure 1).

1.1 Simulation

For simulation, we used an imperfect FS lattice, with E+B elements randomly tilted about the optical axis by angles picked from the normal distribution $N(8 \cdot 10^{-2} \text{ [rad]}, 10^{-2} \text{ [rad]})$.

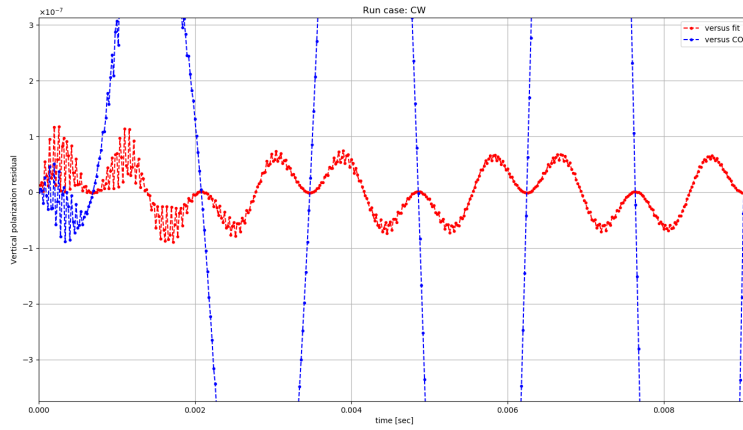


Figure 1: Vertical polarization residuals, computed as the difference between P_y (data) and: (red) \hat{P}_y (model prediction), (blue) S_y^{co} (reference particle vertical spin component). The oscillations of the residuals are due to the rapid oscillations caused by the precession axis instability.

References