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Adaptive Modelling of High Energy Electron Coolers - Demands, Progress, Limits

At the state of the art level of high energy electron cooling, requirements for appropriate cooling performance are not easily met by conventional operation means, which calls for online control and modelling tools. A software suite is currently under development to simplify the operation of the 2 MeV Electron Cooler at COSY, FZJ. This software will provide assistance in beam setup and will allow a deeper look into the inherent dynamic beam properties. General task will contain measuring beam and transport channel characteristics such as orbit, Larmor, Galloping effects and its responses, feedback systems for orbit stability, slow running orbit bumps as well as matching and modelling according to the known beam dynamics. Active development and dedicated beam times taught us on crucial focal points of such efforts and will be presented.

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