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Challenges for emittance diagnostics for the ESRF low emittance lattice

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The ESRF will install a new low emittance lattice from 2019 onwards. The horizontal design emittance of about 110 pmrad will give rise to a very small vertical emittance which in the extreme/ideal case of a perfectly well corrected machine may reach values below 1 pmrad. The measurement of such emittances is a challenge for mainly two reasons : the small source beam sizes and the very limited space available in the layout of the new lattice. Some estimations of the reachable theoretical resolution of an X-ray pinhole and a lens imaging setup will be presented as well as a first sketch of the mechanical layout. A discussion on alternative high resolution emittance diagnostics will follow.

Primary author: Dr EWALD, Friederike (ESRF)

Presenter: Dr EWALD, Friederike (ESRF)