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## From Design to Alignment of Thomx quadrupoles

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### Abstract

Quadrupoles for Thomx Facility have been carefully designed and measured due to high constraints of the storage ring. The need of a compact accelerator, 70 m<sup>2</sup> on floor, as well as a beam life time of 20 ms, led to the following requirements for the quadrupole: a gradient of 5 T/m with 20.5mm radius bore, harmonic content better than few  $1.10^{-3}$  at the reference radius of 18 mm, no cross-talk with sextupole placed within 5 cm and a precision of the magnetic axis of 100  $\mu\text{m}$  and the roll angle of 300  $\mu\text{rad}$  for measurements and alignment. Total of 41 quadrupoles have been built and all measured by a rotating coil at ALBA and SOLEIL, providing multipole components, transfer function and magnetic center. Cross-check measurements have also been carried out with a versatile stretched wire from ESRF at LAL. This paper mainly describes results of simulations with OPERA and RADIA and provides the results of measurements with these three benches. These results will be compared and highlighted important points for the alignment and installation of quadrupoles in an accelerator.

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