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Beam-beam long range compensator mechanical demonstrator

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Beam-Beam Long-Range Compensators employing current-carrying wires are considered as valuable options in hadron colliders to increase dynamic aperture at small crossing angles. This paper presents a simple design proposal for application at CERN LHC. The preliminary design allows for a certain scalability of the number of modules, current flowing in the wire, and dimensions. It complies with two key requirements: (a) the use of a thin, bare metal wire that allows for movement as near to the beam as necessary while minimising interactions with beam particles and meeting the specified DC current target; and (b) a wire support that is both an electrical insulator and a thermal conductor (ceramic).

A molybdenum wire, vacuum brazed on an aluminium nitride support, is proposed, and the design is conceptually proved through the realisation and extensive test of a demonstrator device. The wire brazing validation, as well as the system's heat management, which are the most critical aspects, are given particular regard.

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Footnotes

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Yes

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