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Design of permanent magnet dipoles-quadrupoles with longitudinal gradient for the PETRA IV storage ring

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The PETRA IV storage ring is a project planned to upgrade the synchrotron light source PETRA III at DESY. The main aim is to decrease the horizontal emittance as low as 20 pmrad. This nominal emittance will be achieved by a hybrid six bend achromat lattice (H6BA) and a series of damping wigglers. The magnets used in this lattice will be a combination of resistive quadrupole and higher multipole magnets and permanent dipole magnets.

Three different types of permanent combined-function dipole-quadrupole magnets are presently developed, including one with an additional longitudinal gradient. The design structure is a further advancement of the well-proven ESRF-EBS dipoles with longitudinal gradient. Due to its moderate value, the transverse gradient can be implemented by a slanted pole design. This contribution presents the design status of these novel magnets, discusses the expected magnetic field characteristics, and outlines the mechanical design for a prototype.

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Footnotes

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Yes

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