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Magnetic measurements for Halbach-type permanent quadrupoles using a single-stretched wire system

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In the framework of the acceleration techniques, the Plasma Wake Field Acceleration (PWFA) is one of the most promising in terms of high machine compactness. For this purpose, a crucial role is played by the particle beam focusing upward and downward the plasma-beam interaction, performed by high gradient Permanent Magnet Quadrupoles (PMQs). In the framework of the INFN-LNF SPARC_LAB (Sources for Plasma Accelerators and Radiation Compton with Laser And Beam) six Halbach-type PMQs have been tested before installing them into the machine. This paper presents the outcomes of magnetic measurements conducted using a Single-Stretched Wire (SSW) system. The results include comprehensive details on integrated gradients, magnetic multipole components, and roll angles of the magnets. By considering the operational parameters of the machine, the results show that the tested magnets can be feasibly installed only within limited triplets configurations.

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