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Eight-piece quadrupole magnet allows precise pole tip positioning

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Quadrupole magnets are used extensively in particle accelerators, synchrotrons, and storage rings around the world. High field quality specifications are required for the quadrupole magnets at these facilities. Precise positioning of pole tips is needed to obtain high-quality fields in a quadrupole magnet. Typically, solid quadrupole magnet cores are machined with very high precision to obtain precise positional accuracy of the pole tips after assembly. High-precision machining of cores is costly, difficult, and time consuming. An assembly method that allows core pieces to be machined to standard machining tolerances but allows precise positioning of the pole tips on a quadrupole magnet is presented. An eight-piece yoke, with four quarter cores and four pole tips, is used to achieve this. All eight yoke pieces are machined using standard machining tolerances, while the assembly method allows for precise accurate pole tip positioning. This paper discusses the patented eight-piece quadrupole assembly method and assembly technique.

Footnotes

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