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Title **Modular Design and Modular Program for High Gradient Quadrupoles**

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Abstract A "Modular Design and Modular Program" is introduced here for high gradient quadrupoles. It is based on simple flat racetrack coil modules. A systematic, flexible and cost-effective Modular R&D Program will be presented that can be used in developing both high gradient quadrupoles and a variety of high field dipoles. "Modular Design" offers a relatively simple and inexpensive mechanism for changing apertures and field gradients using the same coil modules. This is particularly useful in the early stages where the parameters cannot be frozen. This is similar to the positive experience gained with the common coil magnet design, where flat racetrack coils facilitated an inexpensive rapid-turn-around R&D program. High gradient quadrupoles, such as those being developed for LHC luminosity upgrade, must use brittle conductors like Nb₃Sn that must be reacted at high temperatures. This requires dealing with differential thermal expansion of various components, the influence of which becomes more critical and harder to predict in a long magnet with complex end geometry. Since the proposed modular design is based on simple flat racetrack coils, it also offers a good likelihood of success.

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Footnote

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