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Bi-2212 Coil Technology

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From a magnet designer's point of view Bi-2212 round conductor is, in many aspects, the ideal candidate for high field magnets. Besides very high critical current densities that exceed specification for conductor of the Future Circular Collider (FCC) of 1500 A/mm² in 16 T background, it offers two particular advantages over other HTS conductors, namely that it is available as an up to one mile long round wire, that it has many finely distributed filaments, which can be twisted to reduce AC losses, that it behaves electromagnetically isotropic thus eliminating the need of distributing graded conductor throughout a coil, that it offers a very flexible and adaptable architecture, and that it can be cabled easily to provide conductor for high current carrying coils with low inductance. These advantages, however, come at the cost of low mechanical properties of the bare conductor, which are similar to Nb₃Sn strand. In very high field magnet systems above 30 T extremely high stresses will have to be mitigated and a thorough understanding and control of the coil mechanics is paramount. In this presentation we will present an update of our coil R&D efforts with a focus on coil reinforcement.

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