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High Field Magnets using High Temperature Superconductors

Tuesday, 19 October 2021 11:00 (25 minutes)

Soon after their discovery at the end of the 80's, Cuprate High Temperature Superconductors (HTS) were expected to trigger a revolution in high field magnets thanks to their extremely high irreversibility field at low temperature. The difficulty to make these brittle ceramics into practical conductors led to a 20 years delay, with the first significant high field HTS magnet prototypes appearing after 2010. In the last 5 years, a few all-superconducting solenoids with field high than 23.5T were tested, with the latest ones exceeding 30T.

We will present an overview of recent HTS conductor performances and availability. We will then introduced the HTS high field magnet performances expected in the near future in a few major ongoing projects and explain why there is still much to do to fully exploit HTS conductor's specifications.

Finally, we will try to translate the performances of these magnets, which are mostly solenoids for NMR and/or magneto-science, into plausible Neutron Scattering Magnet specifications in order to sketch a possible roadmap for HTS Neutron Scattering Magnets.

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Session Classification: Providing the right experimental conditions - for real (Chair: Arno Hiess)