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Fri-Mo-PL6-01: Commercialization of Superconducting Technologies - CFS, MIT and High-field Fusion

Friday, 27 September 2019 10:30 (45 minutes)

MIT and Commonwealth Fusion Systems (CFS), a new startup company focused on the rapid commercialization of fusion, are jointly pursuing a privately-funded, accelerated approach to demonstrate the feasibility of fusion energy. The CFS/MIT team is currently developing a new generation of high-field, large-bore, REBCO-based superconducting magnets to incorporate into a compact net-energy tokamak called SPARC that will demonstrate net fusion energy gain. The key performance metrics in a tokamak scale as the strength of the toroidal magnetic field to the third or fourth power times the volume of the device. One of the most important consequences of these scalings is that increasing the magnetic field in a tokamak enables a much smaller device to demonstrate net-energy production, leading to dramatic reductions in cost, timeline, and organizational complexity required to construct and operate the fusion device. Thus, the development of high-field, large-bore REBCO magnets is existential for the success of the SPARC project and motivates an aggressive plan to scale up the existing supply base of REBCO coated conductors, build an HTS TF model coil, and test it within the next two years. Over the past year, the SPARC team has performed much of the groundwork to enable the magnet development project. On the technical side, the team has collaborated with HTS centers of excellence to evaluate/improve the performance of REBCO from leading manufacturers, designed and built our own HTS measurement facilities, and performed several cable-level tests both in-house and at the SUL-TAN facility. On the programmatic side, we have raised \$115M of private capital, grown a combined MIT/CFS team of over 100 people working on the SPARC effort, built magnet development, construction, and testing spaces at both MIT and CFS facilities, and placed orders for several hundred km of REBCO coated conductor. This talk will present a summary of the work above and discuss plans for the future.

If you are interested in receiving Dr. Sorbom's presentation from the MT26 Conference, please contact Dr. Sorbom by email at: brandon@cfs.energy.

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