

## Design and Operation of Pulsed Power Systems built to ESS Specifications

Diversified Technologies, Inc. (DTI), in partnership with SigmaPhi Electronics (SPE) has built three long pulse solid-state klystron transmitters to meet spallation source requirements. Two of the three units are installed at CEA Saclay and the National Institute of Nuclear and Particle Physics (IN2P3), where they will be used as test stands for the European Spallation Source (ESS).

The systems delivered to CEA and IN2P3 demonstrate that the ESS klystron modulator specifications (115 kV, 25 A per klystron, 3.5 ms, 14 Hz) have been achieved in a reliable, manufacturable, and cost-effective design. There are only minor modifications required to support transition of this design to the full ESS Accelerator, with up to 100 klystrons. The systems will accommodate the recently-determined increase in average power (~660 kW), can offer flicker-free operation, are equally-capable of driving Klystrons or MBIOTs, and are designed for an expected MTBCF of over ten years, based on operational experience with similar systems.