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Wed-Af-Po3.23-03 [88]: Design, Construction and Operation of New Duplex Magnet at Pulsed Field Facility-NHMFL

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The Pulsed Field Facility (PFF)- National High Magnetic Field Laboratory (NHMFL) in Los Alamos, New Mexico has developed and operated a several types of ultra-high field pulsed magnets, including 100 T Multi-shot, 60 T Long Pulse, and an array of small 65 T magnets for users. Separately powering (nested) coils allows to both reduce the driving voltages and have a further degree of control over the pulse duration and therefore the current carrying capacity in conductor to maximize the produced magnetic fields. Duplex design with two nested coils powered separately by two capacitors has been used at several pulsed field centers to increase the generated magnetic field. In last year, PFF-NHMFL focus on developing such a magnet to generate maximum magnetic field up to 78 Tesla using existing 16 kV −4 MJ capacitor bank. The magnet is expected to prove 75 Tesla magnetic field during regular operation. A Metal Oxide Varistor (MOV) bank is used to protect the capacitor bank and its associated electrical components from the overvoltage in the case of fault happen in the duplex magnet. This paper will outline the design, construction and operation of that magnet and the MOV bank.

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