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Sat-Af-Or2-03: Design of dual- and triple-coil magnets at the Dresden High Magnetic Field Laboratory

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The Dresden High Magnetic Field Laboratory (HLD), a member of the European Magnetic Field Laboratory (EMFL), is a pulsed-field user facility that allows external and internal researchers to perform a wide range of experiments in pulsed magnetic fields [1]. Taking advantage of two independent, modular 50 and 14 MJ capacitor banks with charging voltages up to 24 kV, we operate a large variety of non-destructive pulsed magnets with a wide range of technical specifications, such as peak field, magnet-bore diameter, pulse duration, and cooling time. All our pulsed magnets are designed and manufactured at the HLD. Some of them are specially tailored for specific, advanced experimental techniques to ensure optimal scientific outcome. Furthermore, within our magnet-technology developments, we pay special attention to magnet reliability, low noise levels, and magnet longevity.
Specifically for the magnetic field range above 90 T, which is challenging to achieve with monocoil magnets, we have developed 9 MJ dual-coil and 27 MJ triple-coil non-destructive pulsed magnets, which are now in production. We report details of the design, including challenges, upgrades, and improvements, and our operating experience with the multi-coil prototypes at the HLD.
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[1] http://www.hzdr.de/hld

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