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Design and Operation of the Pulsed Magnets at the Dresden High Magnetic Field Laboratory

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The Dresden High Magnetic Field Laboratory (HLD) is a pulsed-field user facility which provides external and in-house researchers with the possibility to perform a broad range of experiments in pulsed magnetic fields [1]. Two independent, modular capacitor banks of 14 and 50 MJ with a maximum charging voltage of 24 kV deliver energy for ten mono-coil and dual-coil pulsed magnets generating magnetic fields up to 95 T available for users. A pulsed-magnet-development program at the HLD targets to increase the peak fields, reliability, and longevity of the pulsed magnets. Another important goal is to decrease the cooling time and the noise level in the pulsed magnets. Since most of the pulsed magnets are stress limited, the inner and outer reinforcement, as well as the choice of conductors plays a crucial role in magnet design and performance. We discuss recent progress, design improvements, and our long-standing experience in the production and operation of the pulsed magnets at the HLD. In particular, we analyze in detail the performance of the dual-coil magnets in the field range of 85 –95 T. We discuss further prospects for the non-destructive pulsed magnets as well.

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[1] <http://www.hzdr.de/hld>

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