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The Development of Persistent joints for MgB₂ Conductors

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Two different routes have been developed for persistent joints in react and wind MgB₂, relevant to MRI. The first uses superconducting solder, the second does not. The joints were developed using standard MgB₂ multifilamentary in-situ type strand. Both joint types assumed a react and wind approach. Two types of tests were performed. The first type was a direct I-V (4-point) measurement of the joints. This measurement was made at 4.2 K in fields of up to 7 T, and also at self-field at temperatures up to 30 K. In the second, a persistent current was induced in a small coil and its decay measured. These measurements were performed at 4.2 K, but in some cases in the presence of a background field. Direct I-V measurements show R values of below 10-10 ohms, and an I_c above 100 A at 0.5 T and 4 K for the first joint type. The second joint type achieved 200 A at several Tesla and 4.2 K. Results of numerous direct I-V and several drift measurements are compared, and the utility for MRI systems is discussed.

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