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The Field-Reversed Configuration as a Practical Fusion Reactor Core

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The field-reversed configuration (FRC) is a class of magnetically confined plasmas characterized by self-generated poloidal fields and no toroidal fields. The FRC has a high beta value, the ratio of plasma pressure to magnetic field pressure, which means that the required strength of the external magnetic field is much lower when compared to other magnetic confinement schemes. Consequently, the achievable temperatures are much higher, which leads to the possibility of aneutronic fusion. The FRC has other technical benefits that make it a practical means to achieve nuclear fusion including simple linear geometry, and natural diverter systems for particle extraction and direct energy conversion. In this talk, I will discuss the technical benefits of the FRC as a practical fusion reactor core. I will also present the current research being performed in this area, the role of Canada in the worldwide fusion programme, and an outlook to the future of magnetic confinement fusion.

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