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Behind the High Power Targetry RD at Fermilab.

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A high-power target system is a key beam element to complete future High Energy Physics (HEP) experiments. In the recent past, major accelerator facilities have been limited in beam power not by their accelerators, but by the beam intercepting device survivability. The target must then endure high power pulsed beam, leading to high cycle thermal stresses/pressures and thermal shocks. The increased beam power will also create significant challenges such as corrosion and radiation damage that can cause harmful effects on the material and degrade their mechanical and thermal properties during irradiation. This can eventually lead to the failure of the material and drastically reduce the lifetime of targets and beam intercepting devices. In order to operate reliable beam-intercepting devices in the framework of energy and intensity increase projects of the future, it is essential to develop a strong RD program and have synergy with various expertise. After presenting the high power targetry challenges facing next generation multi-MW accelerators, we will give an overview of Fermilabs RD program in support of High Power Targetry development. The RaDIATE collaboration (Radiation Damage In Accelerator Target Environment), managed by Fermilab, also draws on existing expertise in related fields to execute a coordinated strategy for high power targetry RD between the 14 international member institutions.