

## Fusion studies of low-intensity beams using an active-target time-projection chamber

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In the coming years a new generation of radioactive-beam facilities is due to enter service, offering the opportunity to extend fusion studies to ever more exotic nuclei. Many of the most interesting species will likely be produced with extremely low yields, however, making traditional thin-target approaches unfeasible. In addition, the weakly-bound nature of the most exotic systems will enhance the contribution of breakup and transfer channels. In order to fully exploit these new facilities novel detection methods are therefore required. An active-target time-projection chamber (AT-TPC) is under development at the National Superconducting Cyclotron Laboratory for use with the forthcoming re-accelerated beam facility, ReA, which seeks to address these issues. The use of an active target permits an arbitrarily-thick target to be presented, greatly extending the domain of nuclei which may be studied, while also permitting the simultaneous study of transfer and breakup channels. Fusion measurements using a half-scale prototype of the AT-TPC coupled to the TwinSol radioactive beam facility at the University of Notre Dame will be presented, and the outlook for future studies using the full-scale AT-TPC discussed.