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A neutral atom-molecular ion collider: progress towards state-to-state resolution in a chemical reaction[1] MING-FENG TU, SHIH-KUANG TUNG, BRIAN ODOM, Department of Physics and Astronomy, Northwestern University — In our recent experiment [1], we demonstrated a scheme to prepare AlH^+ molecules in a single quantum state. This new development opens up new possibilities to study chemical reactions with state-to-state resolution. Moving towards this new direction, we designed an experimental apparatus to study reactive interactions between neutral Rb atoms and AlH^+ molecules. Our hybrid machine consists of a Rb MOT and a spatially separated AlH^+ ion trap. A translatable dipole trap will be used to bring the Rb atoms to interact with the trapped AlH^+ molecules and will allow us to accurately control the collisional energies. Here we report our progress on building this experimental apparatus.

[1] C.-Y. Lien, C.S. Seck, Y.-W. Lin, J.H.V. Nguyen, D.A. Tabor, and B.C. Odom. Nat. Commun. 5, 4783 (2014).

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