1067-13-408   **Kristen A Beck*** (kbeck@uta.edu), Department of Mathematics, The University of Texas at Arlington, P.O. Box 19408, Arlington, TX 76013. *Conditions for the existence of totally reflexive modules.* Preliminary report.

A finitely generated module M over a Noetherian ring R is called *totally reflexive* if each of the following hold:

1. $\operatorname{Ext}^i_R(M, R) = 0$ for all $i > 0$,

2. $\operatorname{Ext}^i_R(M^*, R) = 0$ for all $i > 0$, and

3. $M \cong M^{**}$ via the canonical biduality map.

In this talk, we will characterize the Hilbert series of a local ring $(R, \mathfrak{m})$ with $\mathfrak{m}^4 = 0$ which admits totally reflexive modules with linear complete resolutions. In particular, we show that if such a ring R with embedding dimension e admits certain asymmetric complete resolutions, then $H_R(t) = 1 + et + et^2 + t^3$.

We also investigate the orbits of the Auslander-Reiten translates of totally reflexive modules over finite dimensional algebras. (Received September 01, 2010)