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**Kristen A Beck\*** (kbeck@uta.edu), Box 19408, Arlington, TX 76019. *Characterizing rings which admit non-trivial totally reflexive modules.* Preliminary report.

Let  $R$  be a commutative local noetherian ring, and  $M$  a finitely generated  $R$ -module. If we let  $M^*$  denote the dual of  $M$ , that is  $M^* = \text{Hom}_R(M, R)$ , then  $M$  is called totally reflexive if and only if

1.  $\text{Ext}_R^i(M, R) = 0$  for all  $i > 0$ ,
2.  $\text{Ext}_R^i(M^*, R) = 0$  for all  $i > 0$ , and
3. the natural biduality map  $\delta_M : M \rightarrow M^{**}$  is an isomorphism of  $R$ -modules

In this talk, we will investigate necessary and sufficient conditions for such a ring to admit non-trivial totally reflexive modules. (Received September 22, 2009)