1052-13-354 **Lars Winther Christensen** (lars.w.christensen@ttu.edu), Department of Mathematics and Statistics, Texas Tech University, Lubbock, TX 79409-1042, and **W. Frank Moore*** (fmoore@gmail.com), Department of Mathematics, Cornell University, Ithaca, NY 14853. *On G-regular local rings and Golod homomorphisms.* Preliminary report.

A module G over a local ring $(R, \mathfrak{m}, k)$ is totally reflexive provided there is a complex of finitely generated free R-modules

$$\mathbf{F} = \ldots \longrightarrow F_{n+1} \xrightarrow{\partial_{n+1}} F_n \xrightarrow{\partial_n} F_{n-1} \longrightarrow \cdots$$

such that G is the cokernel of ∂_0 and $\mathrm{Hom}_R(\mathbf{F}, R)$ is exact. Such modules were first studied by Auslander and Bridger. A ring for which every totally reflexive module is free is called $\mathcal{G}$-regular.

Such rings have been studied in work of Takahashi and Yoshino, and have appeared implicitly in work of Christensen-Piepmeyer-Striuli-Takahashi. In this preliminary report, we unify many of the examples of $\mathcal{G}$-regular rings that exist in the literature by showing that if $\varphi\colon Q \to R$ is a Golod homomorphism, then under certain conditions R is $\mathcal{G}$-regular. (Received September 01, 2009)