1129-35-227 **Mathew Gluck*** (mathew.r.gluck-1@ou.edu), Department of Mathematics, 601 Elm Ave., Norman, OK 73019-3103, and **Meijun Zhu**. *An Extension Operator on Bounded Domains and Applications.*

For bounded smooth domains $\Omega \subset \mathbb{R}^n$ and suitable exponents p and q we study a Hardy-Littlewood-Sobolev (HLS) type inequality related to a harmonic-extension operator $L^p(\partial\Omega) \to L^q(\Omega)$. In the case that $\Omega = B_1$, the sharp form of the HLS type inequality was obtained by Dou and Zhu. Here we obtain the inequality for a general bounded domain Ω and show that if the extension constant for Ω is strictly larger than the extension constant for B_1 then extremal functions exist. Using suitable test functions we show that this criterion is satisfied by an annular domain whose hole is sufficiently small. The construction of the test functions is remarkably simple and is not based on any positive mass type theorems. By using a similar choice of test functions with the Poisson-kernel-based extension operator we prove the existence of abstract domain having zero scalar curvature and strictly smaller isoperimetric constant than that of a Euclidean ball. (Received March 16, 2017)