1062-28-240 **Jasun Gong***, Department of Mathematics, 301 Thackeray Hall, University of Pittsburgh, Pittsburgh, PA 15260. *Sobolev Imbeddings and Higher-Order Extensions.* Preliminary report.

This is joint work with P. Hajłasz, P. Koskela, and X. Zhong.

Let $p > n$. Suppose that a domain Ω in $\mathbf{R}^n$ has the $W^{1,p}$-*extension property*; that is, there is a bounded linear operator

$$E : W^{1,p}(\Omega) \to W^{1,p}(\mathbf{R}^n)$$

so that $Ef|_\Omega = f$. It is clear that such domains satisfy the Sobolev imbedding theorem

$$|u(x) - u(y)| \leq C\|\nabla u\|_p |x - y|^{1-n/p}.$$

Here we are interested in the converse direction, namely

Theorem. Let Ω be a domain in $\mathbf{R}^n$ and let $p > n$. The following are equivalent:

1. Ω satisfies the Sobolev imbedding theorem;
2. Ω has the $W^{1,q}$-extension property, for each $q \geq p$;
3. For each $m \in \mathbf{N}$, Ω has the $W^{m,q}$-extension property, for each $q \geq p$; that is, there exists a bounded linear operator $E_m : W^{m,p}(\Omega) \to W^{m,p}(\mathbf{R}^n)$ so that $E_m f|_\Omega = f$.

If time permits, we will also discuss the borderline cases $p = \infty$ and $p = n$. In the first case, our main result recovers a classical theorem of H. Whitney. (Received August 10, 2010)