1110-35-282 **Qi Han*** (qhan@wpi.edu), Department of Mathematical Sciences, Worcester Polytechnic Institute, Worcester, MA 01609. *Compact embedding results of Sobolev spaces and positive solutions to an elliptic equation in R^N.* Preliminary report.

Using a regular Borel measure $\mu \geq 0$ that vanishes on each set of capacity zero, we derive a proper subspace $D^1_\mu(R^N)$ of $D^1(R^N)$ when $N \geq 3$. This space $D^1_\mu(R^N)$ is compactly embedded into $L^1(R^N)$. An equivalence characterization and an example are provided that guarantee such a property. An example is also given if one is only interested in the compact embedding to $L^r(R^N)$ for $1 \leq r < 2$. Moreover, similar results can be derived for general $D^{1,p}_\mu(R^N)$ when $1 < p < N$, while when $p = N$, we need to use the space $W^{1,N}_\mu(R^N)$. As an application, we prove an existence result of positive solutions to

$$-\Delta u + Vu = \lambda u^r + f(x, u)$$

in $H^1_\mu(R^N)$ or $D^1_\mu(R^N)$ when $N \geq 2$ without the Ambrosetti-Rabinowitz condition on $f(x, u)$. Results for the N-Laplacian problem can be discussed similarly when we have exponentially subcritical growth. (Received February 23, 2015)