1089-35-99 **Meijun Zhu*** (mzhu@ou.edu). *Reversed sharp Hardy-Littewood-Sobolev inequality.*
We will describe the discovery and proof of the following reversed sharp Hardy-Littlewood -Sobolev inequality for $\alpha > n$: For all nonnegative $F \in L^1(\mathbb{S}^n)$,

$$||\tilde{I}_\alpha F||_{L^{\frac{2n}{n-\alpha}}(\mathbb{S}^n)} \geq N_1^*(n,\alpha)||F||_{L^{\frac{2n}{n+\alpha}}(\mathbb{S}^n)},$$

where

$$\tilde{I}_\alpha F(\xi) = \int_{\mathbb{S}^n} \frac{F(\eta)}{|\xi-\eta|^{n-\alpha}} dS_\eta, \qquad \forall \xi \in \mathbb{S}^n,$$

$$N_1^*(n,\alpha) = \pi^{(n-\alpha)/2} \frac{\Gamma(\alpha/2)}{\Gamma(n/2+\alpha/2)} \{\frac{\Gamma(n/2)}{\Gamma(n)}\}^{-\alpha/n};$$

And equality holds if and only if $F(\xi) = a(1-\xi\cdot\eta)^{-\frac{n+\alpha}{2}}$ for some $a > 0$ and $\eta \in \mathbb{R}^{n+1}$ with $|\eta| < 1$. This is a joint work with J. Dou. (Received February 05, 2013)