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4800 Calhoun road, Houston, TX 77004, and **Kui Ren**. *Active manipulation of fields*.

In this talk we will present our recent results regarding the control of electromagnetic fields by using external fixed active sources (antennas). This extremely ill-posed problem has many potential applications, such as, optimal illumination in imaging, shielding and cloaking, remote sensing, illusion optics. We will describe our existing results in the context of the long wavelength limit and finite frequency regime and discuss the current challenges and future ideas. (Received August 29, 2011)