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Nguyen Lam and **Guozhen Lu*** (guozhen.lu@uconn.edu), 341 Mansfield Road, Storrs, CT 06269, and **Lu Zhang**. *Improved Hardy's identities and inequalities with general distance functions.*

In this talk, we will report some recent works on improved Hardy's type inequalities in the spirit of Brezis-Vazquez and Brezis-Marcus with very general distance functions as weights. We sharpen results in the literature by adding nonnegative remainder terms. Our weights are very general in terms of the Bessel pairs with respect to the distance functions. Both L^2 and L^p improved Hardy inequalities are established. Improved bounds on the constants in the Brezis-Marcus type inequalities in some special cases are obtained. New Hardy-Sobolev-Maz'ya type inequalities are also established. Our main techniques are factorization method of the differential operators together with the Hardy's identities with Bessel pairs with respect to general distance functions. The notion of Bessel pairs was initially introduced by Ghoussoub-Moradifam in the classical distance function. (Received February 04, 2019)