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Luda Korobenko*, korobenko@reed.edu. *Log-Sobolev inequalities, doubling condition, and degenerate elliptic PDE's.*

I will discuss the connection between log-Sobolev type inequalities in general metric measure spaces and the doubling condition on the metric balls. It has been recently shown that the classical (q, p) -Sobolev inequality with $q > p$ implies the doubling condition. In particular, since Carnot-Carathéodory metric spaces associated to infinitely degenerate operators are non doubling with respect to the Euclidean measure, they do not support a classical Sobolev inequality. Weaker types of log-Sobolev inequalities have been shown to hold for such spaces, and then successfully applied in the DeGiorgi iteration scheme to establish regularity of weak solutions. I will show that even certain types of weak log-Sobolev inequalities imply the doubling condition, and establish the best possible (within a particular class) Sobolev inequality one can obtain in the non doubling case. (Received September 10, 2019)