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Luke G Rogers*, Mathematics Department, 196 Auditorium Road, Unit 3009, Storrs, CT
06269-3009. *Smooth bump functions, smooth cut-offs, and heat kernel estimates.*

On a metric measure space with a Dirichlet form we construct a (weak) Laplacian operator and define a function f to be smooth if all powers of the Laplacian applied to f yield continuous functions. Given a smooth function f , a compact set K and a neighborhood U of K , it is natural to ask whether one can smoothly cut off f to obtain a smooth F that is equal to f on K and equal to zero outside U . In the special case that f is the constant function 1 on K we call F a smooth bump function.

I will discuss how one can construct smooth bump functions under the assumption of suitable estimates on the heat operator associated to the Laplacian, and discuss a partial result and some challenges for the general smooth cut-off question. Some applications of these results may be described if time permits.

(This talk is based on work with R. S. Strichartz and A. Teplyaev) (Received January 26, 2010)