

Department of Mathematics, BGU

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## Colloquium

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On Tuesday, June 20, 2017

At 14:30 – 15:30

In Math -101

ARKADY POLIAKOVSKY (BGU)

will talk about

### **Jumps detection in Besov spaces via a new BBM formula. Applications to Aviles-Giga type functionals**

ABSTRACT: Motivated by the formula, due to Bourgain, Brezis and Mironescu,  $\lim_{\varepsilon \rightarrow 0^+} \int_{\Omega} \int_{\Omega} \frac{|u(x)-u(y)|^q}{|x-y|^q} \rho_{\varepsilon}(x-y) dx dy = K_{q,N} \|\nabla u\|_{L^q}^q$ , that characterizes the functions in  $L^q$  that belong to  $W^{1,q}$  (for  $q > 1$ ) and  $BV$  (for  $q = 1$ ), respectively, we study what happens when one replaces the denominator in the expression above by  $|x - y|$ . It turns out that, for  $q > 1$  the corresponding functionals “see” only the jumps of the  $BV$  function. We further identify the function space relevant to the study of these functionals, the space  $BV^q$ , as the Besov space  $B_{q,\infty}^{1/q}$ . We show, among other things, that  $BV^q(\Omega)$  contains both the spaces  $BV(\Omega) \cap L^{\infty}(\Omega)$  and  $W^{1/q,q}(\Omega)$ . We also present applications to the study of singular perturbation problems of Aviles-Giga type.