A Brezis-Nirenberg type result for mixed local and nonlocal operators

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In this talk we present some existence results, in the spirit of the celebrated paper by Brezis and Nirenberg (CPAM, 1983), for a *perturbed critical problem* driven by a mixed local and nonlocal linear operator. More precisely, we develop an existence theory in the cases of linear, superlinear and singular perturbations; in the particular case of linear perturbations, we also investigate an associated mixed Sobolev inequality, detecting the optimal constant, which we show that is never achieved. The results discussed in this seminar are obtained in collaboration with S. Dipierro, E. Valdinoci and E. Vecchi.