

Abstract Submitted  
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**Optical signature of sub-gap absorption in the superconducting state of  $\text{Ba}(\text{Fe}_{1-x}\text{Co}_x)_2\text{As}_2$** <sup>1</sup> URMAS NAGEL, T. RÕÕM, Nat.-I Inst. of Chem. Phys. & Biophys., Tallinn, Estonia, R.P.S.M. LOBO, Y.M. DAI, LPEM, CNRS, UPMC, ESPCI-ParisTech, Paris, France, J. CARBOTTE, T. TIMUSK, McMaster Univ., Hamilton, Canada, D. COLSON, CEA, IRAMIS, SPEC, Gif sur Yvette, France — The optical conductivity of  $\text{Ba}(\text{Fe}_{0.92}\text{Co}_{0.08})_2\text{As}_2$  shows a clear signature of the superconducting gap, but a simple *s*-wave description fails in accounting for the low frequency response. This task is achieved by introducing an extra Drude peak in the superconducting state representing sub-gap absorption, other than thermally broken pairs. This extra peak and the coexisting *s*-wave response respect the total sum rule indicating a common origin for the carriers. We discuss the possible origins for this absorption as (i) quasiparticles due to pair-breaking from interband impurity scattering in a two band  $s_{\pm}$  gap symmetry model, which includes (ii) the possible existence of impurity levels within an isotropic gap model; or (iii) an indication that one of the bands is highly anisotropic. The results are published in Phys. Rev B vol 82, 100506(R) (2010).

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