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STM differential conductance in disordered $Lu_2Ni_2B_2C$ superconductor at low temperatures and high magnetic fields[1] SASHA DUKAN, Goucher College, Baltimore, MD 21204, JOSEPH POREMBSKI, KARL TATA, Goucher College — The tunneling conductance between a surface of a disordered $Lu_2Ni_2B_2C$ superconductor and a Scanning Tunneling Microscope (STM) tip in a high magnetic field and at zero temperatures is calculated. In the clean system we find that when the STM tip is placed at the position of a vortex, the differential conductance σ(V,B) has an algebraic dependence on a bias voltage V reflecting the presence of gapless points in the quasiparticle excitation spectrum of a superconductor in high magnetic fields. When non-magnetic impurities are introduced in the system, the differential conductance at zero bias voltage becomes finite indicating the broadening of the gapless or near gapless regions in the quasiparticle excitation spectrum. We plot the differential conductance σ(V,B) as a function of disorder parameters for wide range of magnetic field strengths B in the mixed state.

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