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Magnetic field-tuned superconductor-insulator transition in amorphous Nb_xSi_{1-x} HERVE AUBIN, ALEXANDRE POURRET, KAMRAN BEHNIA, JEROME LESUEUR, CNRS-ESPCI; 10 rue Vauquelin, Paris, France, CLAIRE MARRACHE-KIKUCHI, LAURENT BERGE, LOUIS DUMOULIN, CSNSM-IN2P3, Orsay, France — New results from a study of amorphous superconducting Nb_xSi_{1-x} thin films will be presented. This system is observed to undergo a superconductor-metal-insulator transition with variations of : Nb concentration, film thickness or magnetic field. On the superconducting compound with x=0.15, the superconducting transition temperature is observed to increase with the film thickness d, (Tc=550mK for d=1000Å; Tc=250mK for d=125Å), and, for each sample, a magnetic-field tuned superconductor-insulator transition is observed. The field tuned transition is characterized by an isobestic point (Bc,Rc) in the magnetic field variation of the magnetoresistance, plotted for various temperatures, that indicate the quantum critical nature of this superconductor-insulator transition and the absence of an intermediate metallic state. We carefully followed the temperature dependance of this critical point (Bc,Rc) and show that the critical field value (Bc) goes down to zero at a temperature scale (1K) well above Tc for every sample studied. This analysis allows us to identify a large region in the diagram (H,T) where exists superconducting fluctuations.

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