

The Potentialities of Quartz Tuning Fork as a Thermometer in Dilution Refrigerator

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Temperature dependences of resonant frequency and the width of resonance of quartz tuning fork, directly immersed into mixing chamber of dilution refrigerator, have been considered for it to be treated as a secondary thermometer. Measurements have been performed both in upper and in lower phase of mixer coolant within temperature range of 15 - 350 mK. The dependences obtained reveal several side effects other than the temperature affecting the characteristics of the resonator. In the upper phase, superfluid film, covering the surface of tuning fork, has a dominant role, whereas in ^4He -rich phase numerous first and second sound resonances are superimposed on its own frequency curve. This will create serious difficulties for the coolant immersed quartz tuning fork be used as the thermometer of the mixing chamber.