Development of Cryocooler without Liquid Helium Cryogen

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We developed a ^{3}He cryocooler that can reach down to 0.6 K. It consists of a mechanical refrigerator and a closed-cycle ^{3}He Joule-Thomson expansion circuit. Since the cryocooler uses a mechanical refrigerator for pre-cooling, it does not require cumbersome liquid helium as a cryogen. The developed cryocooler can run for over a month with a simple procedure. We are developing a thermometer calibration apparatus on the basis of the developed cryocooler. The cryocooler can also be applied to other general apparatuses that require low temperature environment.

Figure : Photograph of the developed ^{3}He cryocooler.