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A compact remote heat transfer device for space cryocoolers

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In this paper a compact remote heat transfer device (CRHD) for cryocoolers is proposed. This device is especially attractive in cases where cryocoolers are not easy to set near the heat source, generally the infrared sensor. The CRHD is designed on basis of the conception of loop heat pipes, while the primary evaporator is located near the cryocooler cold head and a simple tube-in-tube secondary evaporator is remotely located and thermally connected with the heat source for cooling. With such a device a cooling power of 1 W is achieved across a heat transfer distance of about 2 m. The major problem of this device is the low heat transfer efficiency (1 W of net cooling power at the cost of about 7 W of cooling power from the cryocooler), and in the future a secondary wicked evaporator will be used instead of the tube-in-tube evaporator in order to improve the efficiency.

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