

A Cryogen-Free Laboratory Cryostat With Easy Sample Exchange

F.M. Piegsa^a, B. van den Brandt^b, and K. Kirch^a

^aETH Zürich, Institute for Particle Physics, CH-8093 Zürich, Switzerland

^bPaul Scherrer Institute, CH-5232 Villigen PSI, Switzerland

We report on the development of a versatile cryogen-free laboratory cryostat based upon a 1.5 W pulse tube cryocooler. It provides enough cooling power for continuous recondensation of circulating helium gas at a condensation pressure of about 500 mbar. Further, the cryostat allows for easy exchange of different cryostat inserts as well as fast and easy sample exchange (top-loading) with a fast turn-over time of less than 75 min. In a first test using a ⁴He cryostat insert, a base temperature of about 1.1 K was reached within 12 hours starting from room-temperature, employing a 300 m³/h roots pump. A cooling power of approximately 25 mW at 1.2 K was established. Currently, we are investigating the possibility to operate a dilution insert in the same cryostat.