Efficient Preservation of Helium Resources at ILL

Institut Laue Langevin, 6 rue Jules Horowitz, 38042 Grenoble Cedex 9, France - http://www.ill.eu/sane

P. Mendes, S. Baudoin, N. Belkhier, E. Bourgeat-Lami, J.-P. Gonzales, Y. Memphis, E. Lelièvre-Berna, O. Losserand, X. Tonon, S. Turc

liquid helium station

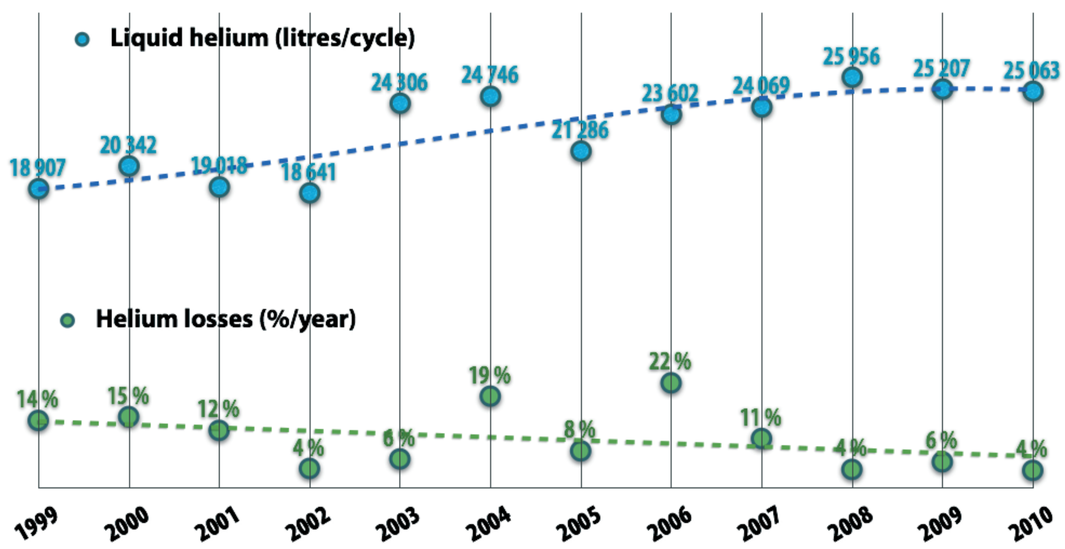
ILL do not have its own helium liquefier. Liquid helium is shipped to ILL in 100L and 250L dewars for immediate consumption. The stock of helium is monitored all along its life at ILL.

Every day, the empty dewars are returned from the instruments and weighted before being sent for refill. Gasometers located on the instruments are used to monitor the individual losses.

The dewars filled the preceding days are weighted to check the quantity that is delivered by the supplier (CEA or CNRS).

distribution to the instruments

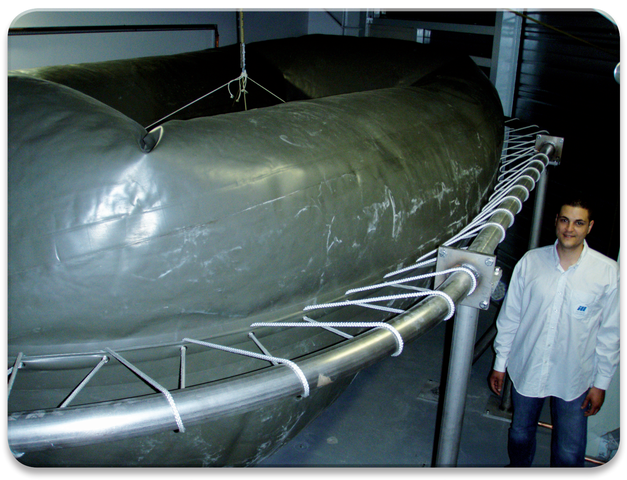
ILL and ESRF counters



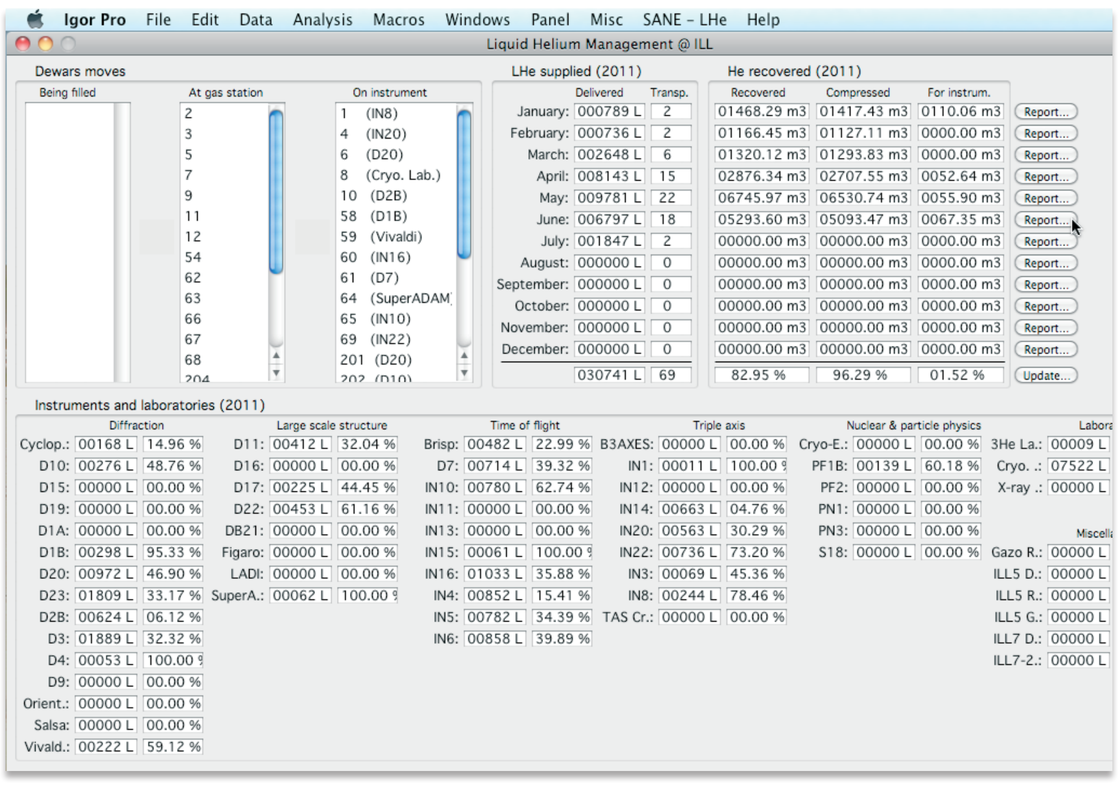
evolution of the consumption of liquid helium per cycle

helium compressors

The gas is collected in a 20 m³ balloon which ensures a relative stability of the pressure in the recovery line. The balloon is emptied by 2 compressors which fill racks of 200 bar bottles at a maximum rate of 300 m³/hour. When a rack of bottles is full, the gas is sent back to the liquefiers.

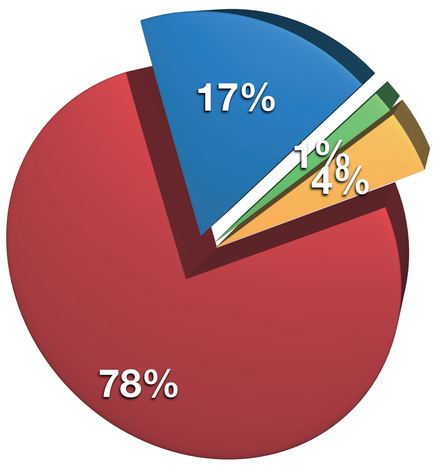


collect of the gas in a 20m³ balloon



status and reporting

200 bar helium storage

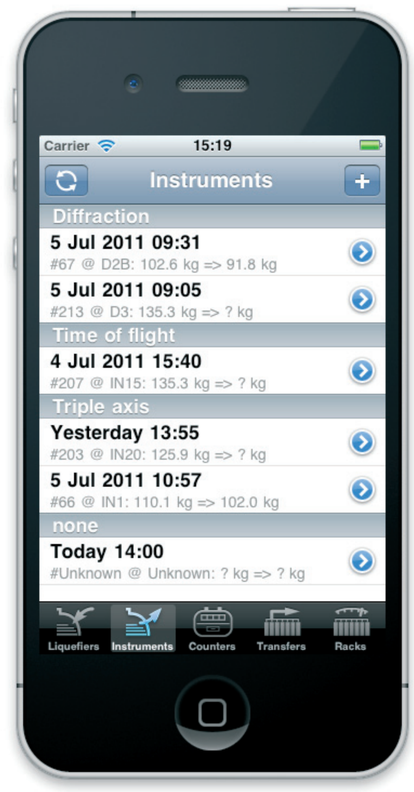


All cryogens taken into account, the provision of liquid helium represents about 82% of the total cost (transport included).

The distribution of liquid helium to ≈40 instruments and the recovery of ≈13 tons of gas per year require a rigorous day-to-day management. In order to ease this task, we use a mobile data terminal in a collaborative way.

This terminal allows us to record the quantity of liquid helium delivered to the institute and used on each instrument, the quantity of gas recovered on each instrument, the volumes sent to the liquefiers and presently stored in our racks, etc. The readings of the main gas counters are performed remotely by electronics connected to the Intranet.

The data are then uploaded to a server. An application downloads these data, calculates the losses and produces automatically the reports for CEA, CNRS, ESRF and ILL. Thanks to the efforts made by the staff and our visiting scientists, more than 95% of the gas is now recovered every year. In 2010, the savings amounted to 400 k€.



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