# Solutions for smart Cold Trap systems

Typical design of cold atomic trap system

- Well focused atomic beam is required

- Very good vacuum level is required in the whole system (in the 10^{-11} torr range)

- Differential pumping system must be considered between evaporation chamber and trapping region

- In many cases only 1 single chamber is used, for both alkali evaporation and trapping experiment

- Magnetic interference must be removed or at least reduced
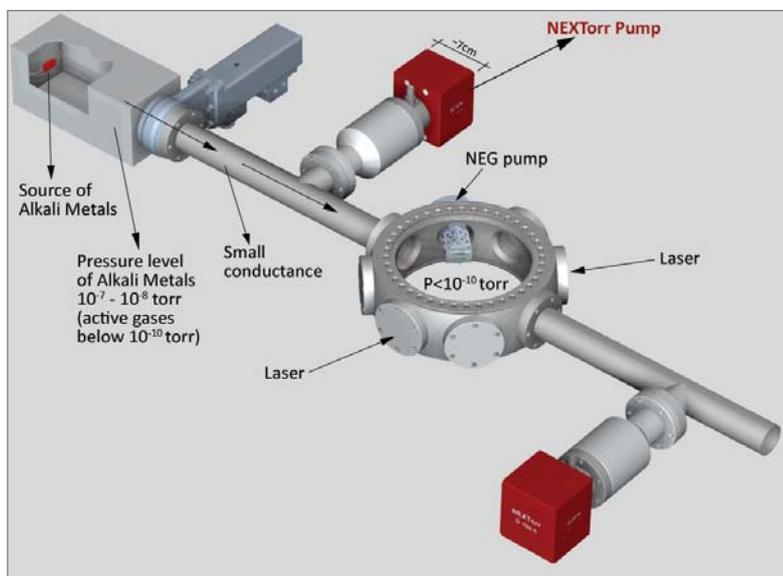
What is the NEXTorr® pump

- The NEXTorr is a combination of a NEG pump (Non-Evaporable Getter) with a small SIP (Sputter Ion Pump)

- The NEG element features very efficient performance particularly for H_2, which is the main residual gas at UHV pressures

- The SIP can efficiently pump Argon and Methane, also providing pressure reading (the lifetime of the trapped atoms is directly proportional to the pressure in the system)

- The NEXTorr is an extremely compact pump: its weight is only 2.2 Kg.

NEXTorr D 100-5 main specs

| H_2 (l/s)	100
O_2 (l/s)	100
CO (l/s)	70
N_2 (l/s)	40
Ar (l/s)	6
CH_4 (l/s)	13
H_2 capacity (Torr.l)	135
CO capacity (Torr.l)	0.6
CO total (Torr.l)	120
Flange	CF35
Weight (Kg)	2.2
Total lenght from the flange (cm)	6.0
Magnetic permeability of NEG	1,0001
Low Magnetic field of Ion element (cm)	
Mu-Metal sheet available for even better shielding	

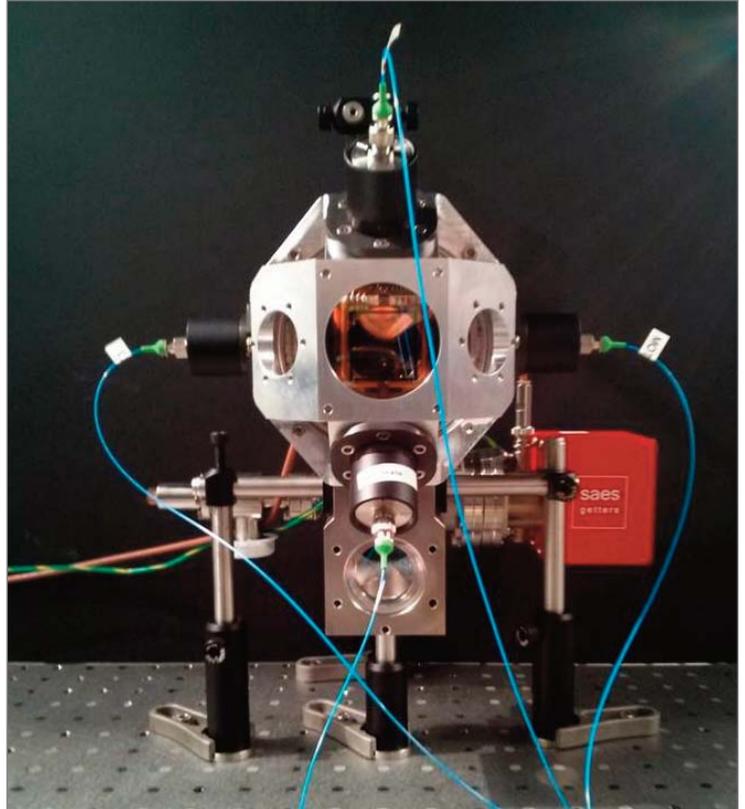**saes group**

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Cold trap system with NEXTorr D-100 (100 l/s)

Courtesy of Mr. Frieder Lindenfelser (group of Prof. Home), ETH Zurich
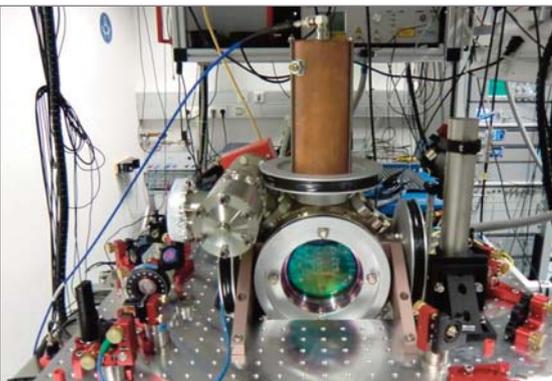
Courtesy of group of Prof. Blatt,
University of Innsbruck
(Institut für Quantenoptik un Quanteninformation)

Courtesy of Dr. Tristan Valenzuela, University of Birmingham for the EU FET-Open project iSense (grant no. 250072)

Cold Trap system with multiple chambers/pumps

CapaciTorr D400

100L Ion Pump

NEXTorr D500

CapaciTorr D200
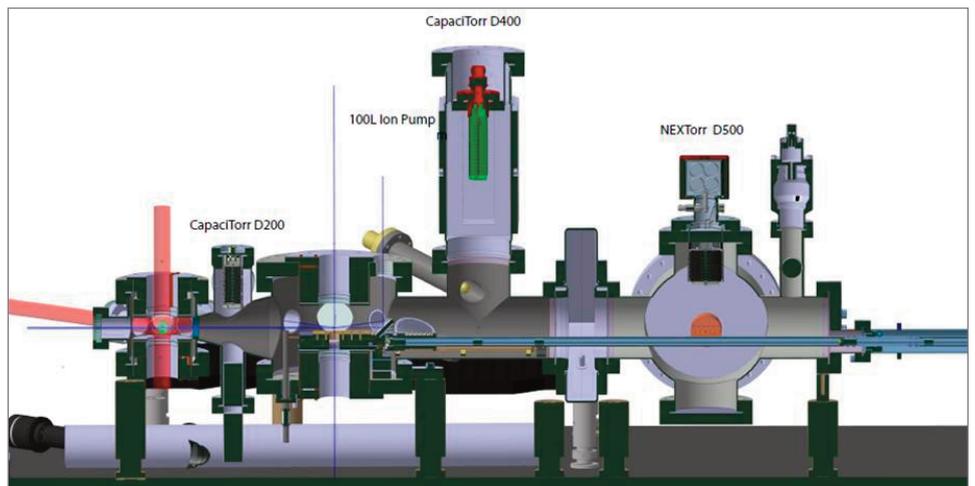
Courtesy of Dr. Julian Leonard (group of Prof. Esslinger), ETH Zurich

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