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Electron Guns for detecting Space Objects and Movement

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Electron Guns for Detecting Space Objects and Movements

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Politecnico di Torino - Politecnico di Milano

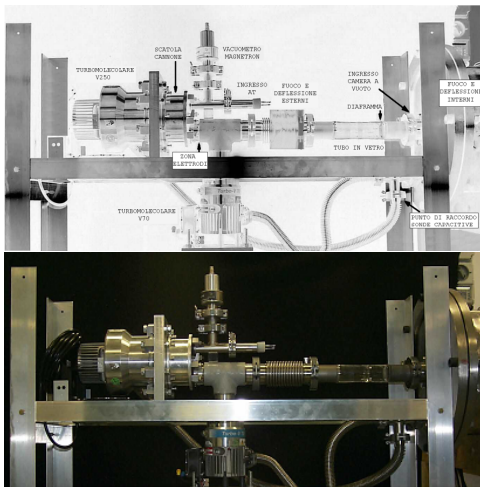
Venturefest 2012, Oxford



PHILOFLUID



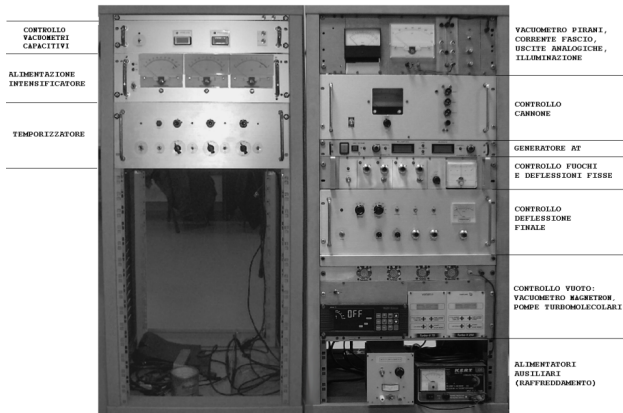
The electron gun



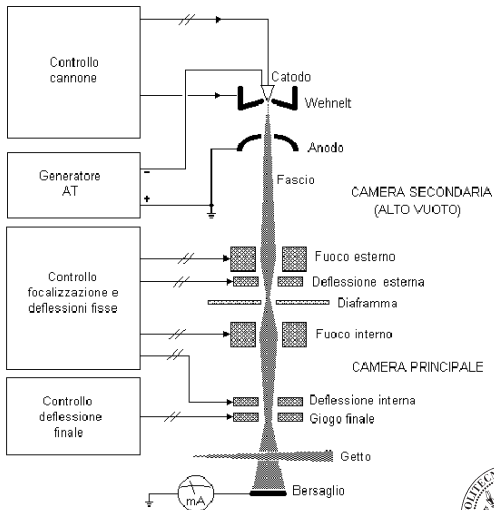
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The control system



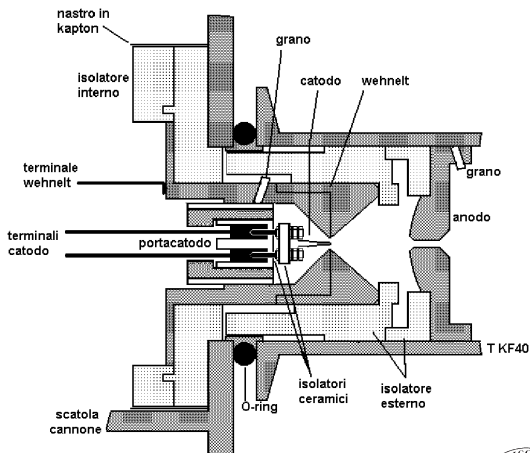
Block scheme of the gun



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Gun interior



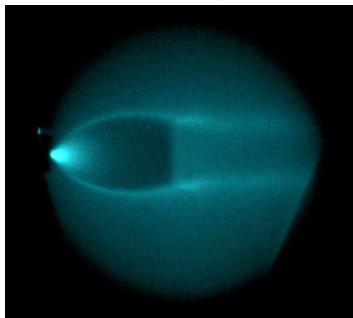
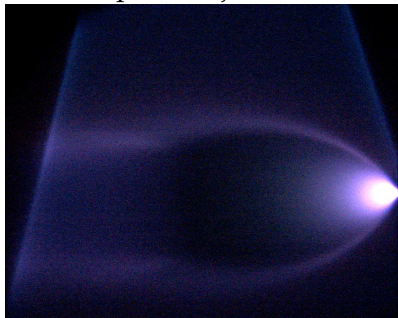
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Astrophysics in the laboratory

New Journal of Physics **13** (2011): [videoabstract](#)

Underexpanded jet, Ar in He ($Ma = 29$, $Re = 3000$)



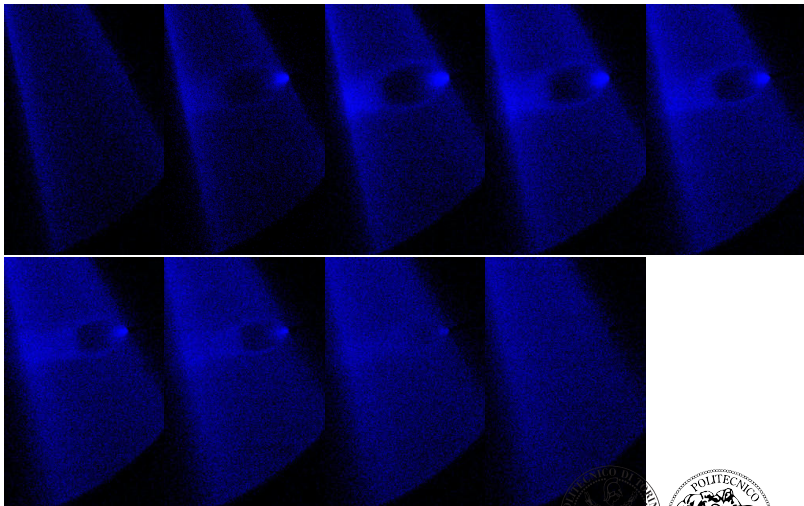
Phys.Rev. E **82** (2010) and *Exp.Fluids* **45** (2008)



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Astrophysics in the laboratory



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Development & applications

Incubator: 3 persons - a **physicist**, an **electronic engineer** and a **mechanical engineer** to design and build a few new prototypes of electron guns of different dimensions for different applications.

E.g.: current average cost of an EG for general research purposes:
 $\approx 50,000$ Euro

Our aim: to reduce the cost to $\approx 10,000$ Euro

Foreseen R&D cost: $\approx 100,000$ Euro

Decreasing the scale:

- nuclear and atomic laboratories, particle accelerators
- welding, electron erosion
- **atrophysics in the lab** (*achieved!*)
- space science
- electronic microscopes
- SED surface-conduction electron-emitter display