

XFEL Injector Vacuum Issues

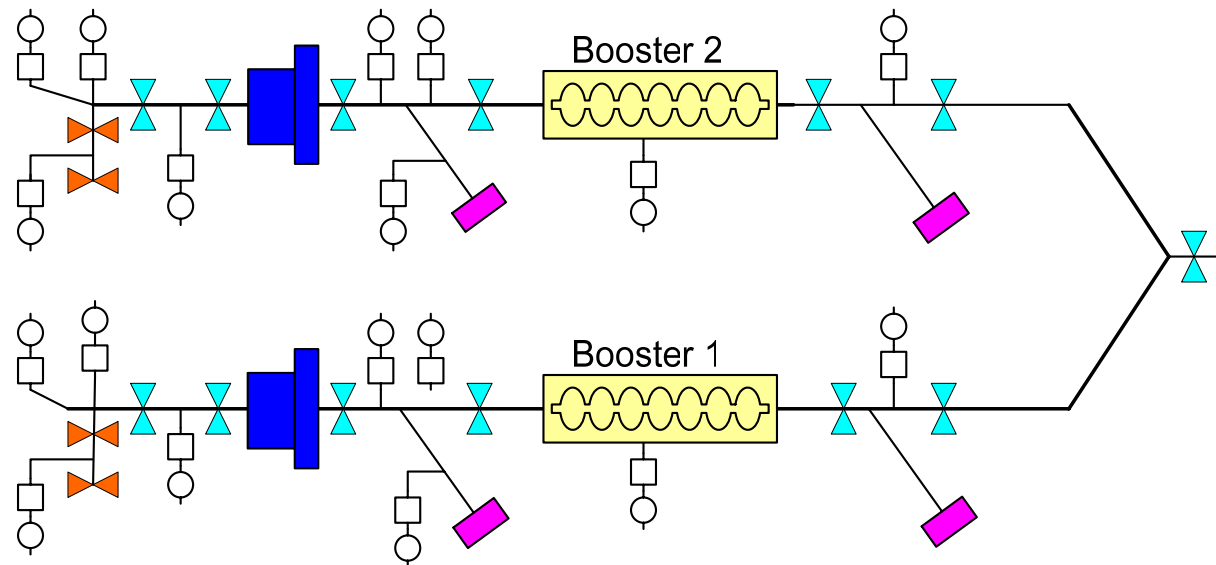
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Injector Review
DESY/Hamburg, Oct. 23, 2006**



- **XFEL injector vacuum system similar to FLASH**

- requirements

- pressure $\sim 10^{-10}$ mbar
 - ↳ titanium sublimation pumps
 - ↳ sputter ion pumps
- particle free
 - ↳ cleaning of all vacuum components in clean room
 - ↳ installation under local clean room

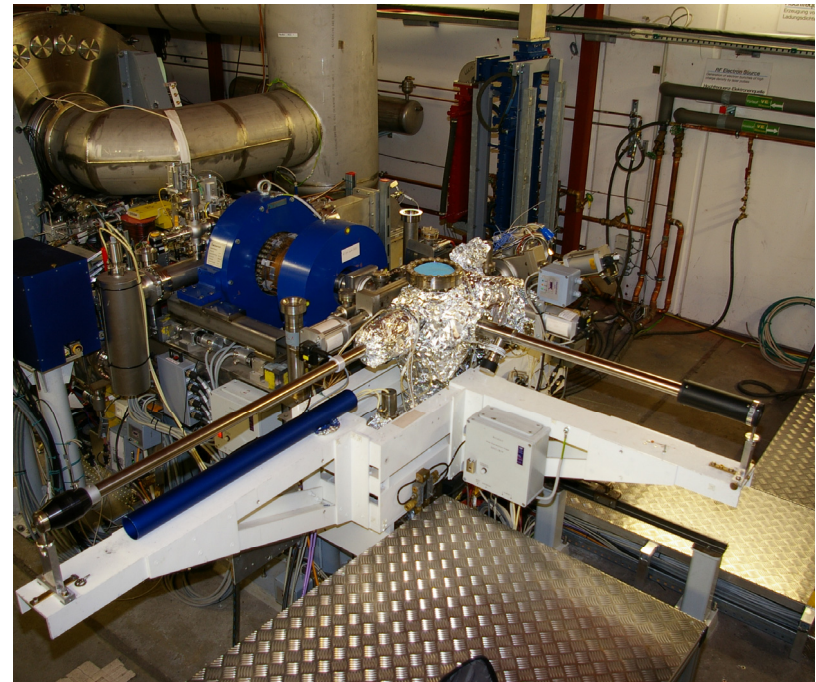


Draft

- working system
- operational experience → optimization necessary

- **Cathode system**

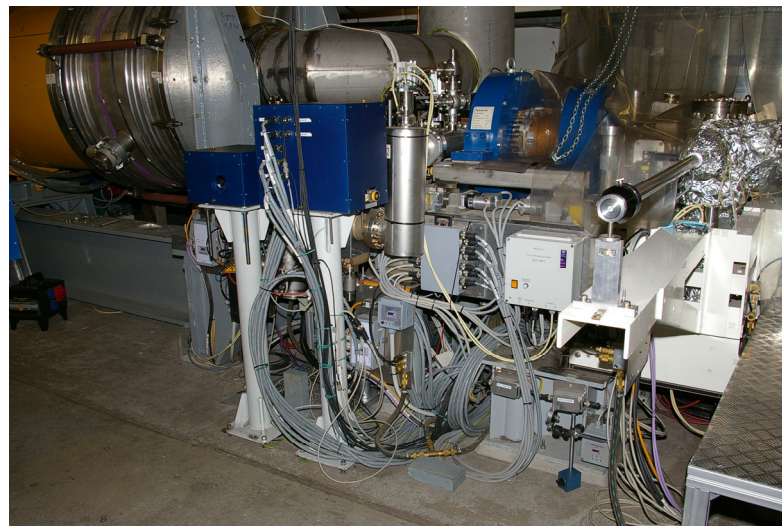
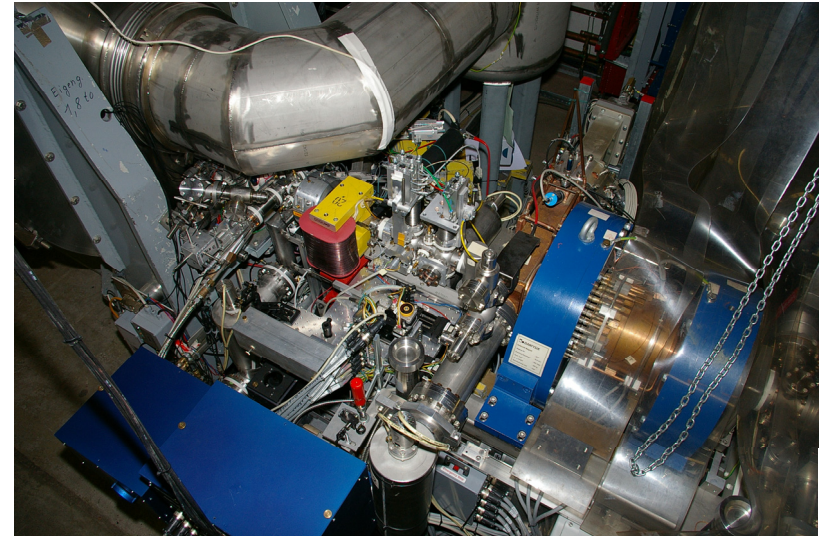
- preparation of cathodes in Milano
- transport to DESY/storage under vacuum
- careful planning required for spare
- life time of cathodes longer than originally expected
 - vacuum conditions sufficient
- exchange of cathodes done manually
 - room for mistakes with severe damage



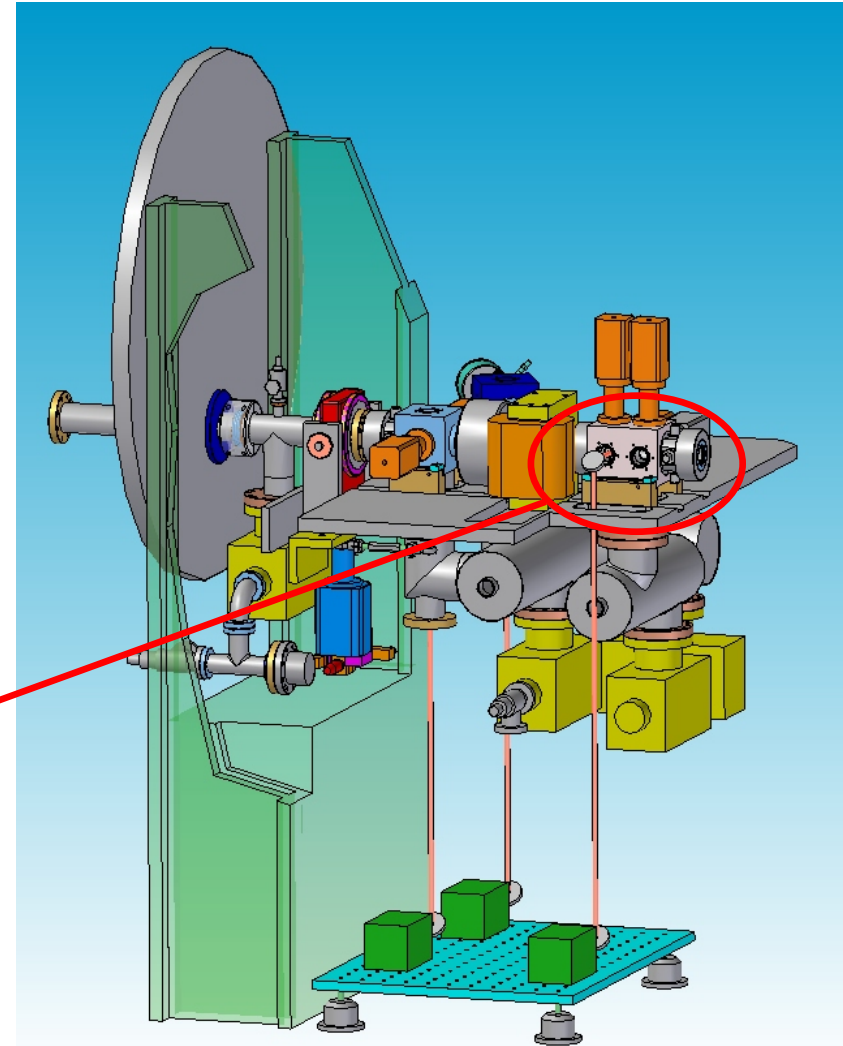
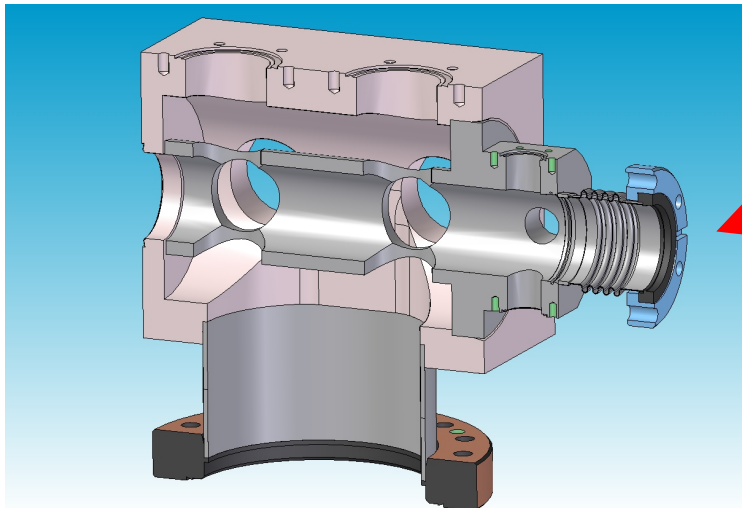
Improvements planned for XFEL

- cathode preparation system at DESY (MIN)
- improved diagnostics for exchange of cathodes

- **Gun – 1. module**
 - extremely compact section
 - limited/complicated accessibility
 - installation
 - repair work
 - alignment of vacuum chambers difficult
 - poor pumping due to limited conductance
 - completely compressed bellows at drive units
 - stability of girder

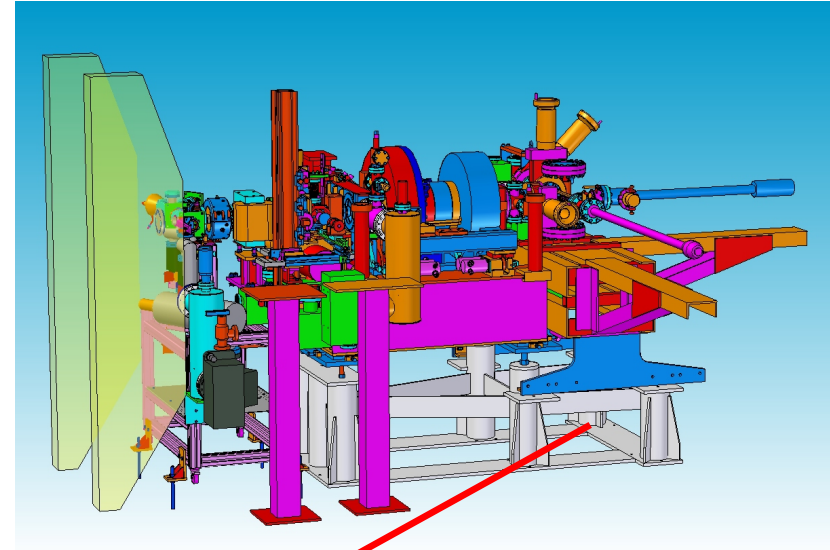
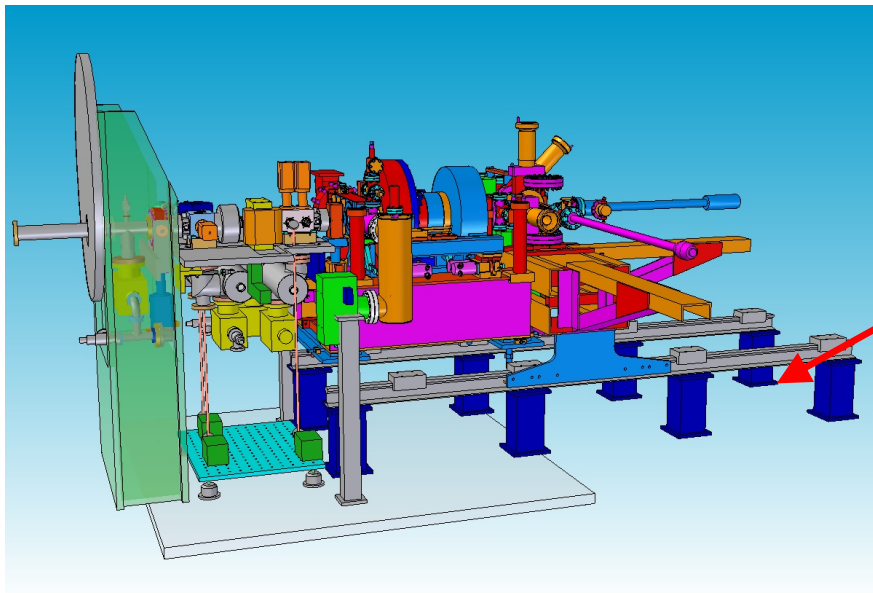


- **Planned improvements for 2007**
 - replacement of vacuum chambers
 - more compact/stiffer diagnostic cross
 - increased pumping conductance
 - additional bellows for alignment
 - improved drive units



- **Planned improvements for 2007**

- new girder structure
- gun/cathode system on sliding carriage



- **FLASH injector perfect test bed for XFEL injector**
 - test improvements for XFEL as soon as possible
- **careful planning of complete system necessary**
 - reserve sufficient space for installation of components
 - modular set-up for good accessibility of components
 - avoid patchwork installations as we do have at FLASH