

SAES GROUP

NEXTorr[®] pumps in e-beam systems



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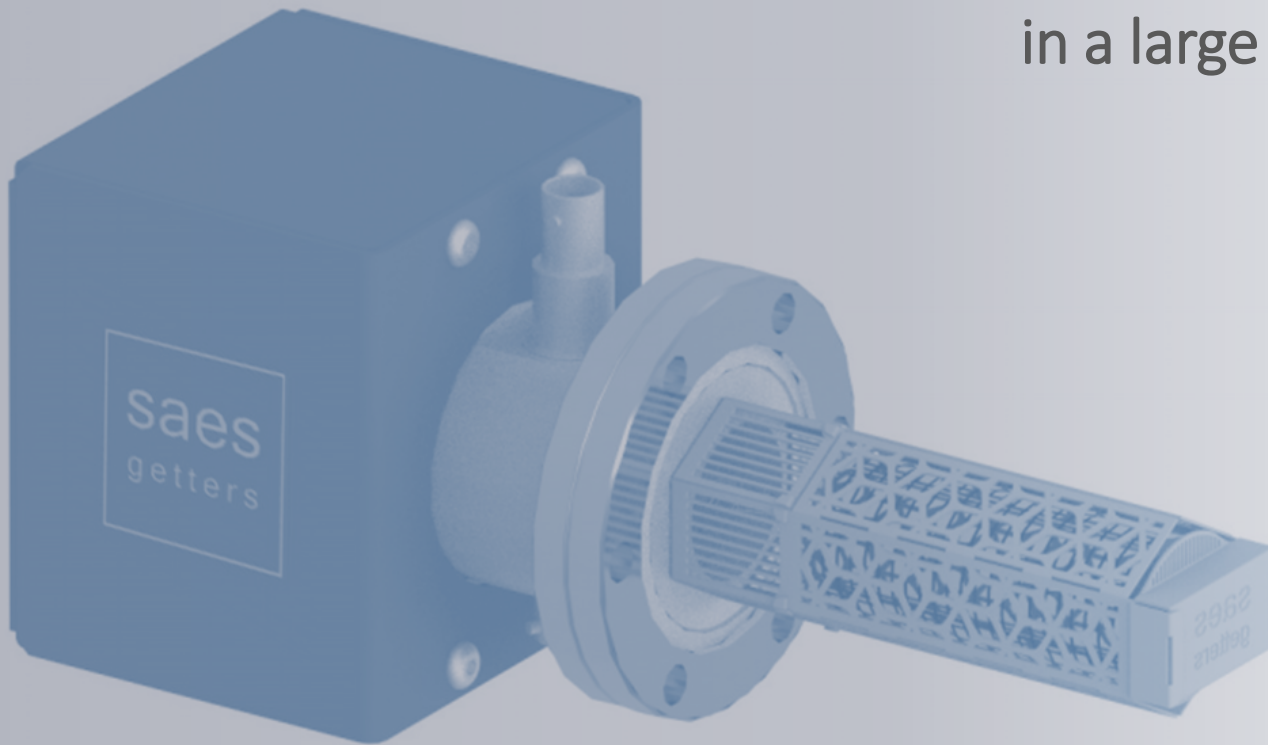
making **innovation happen**, together

NEXTorr[®] pump - March, 2021



NEXTORR[®] PUMPS

The NEXTor is the new benchmark pump
in a large variety of vacuum applications



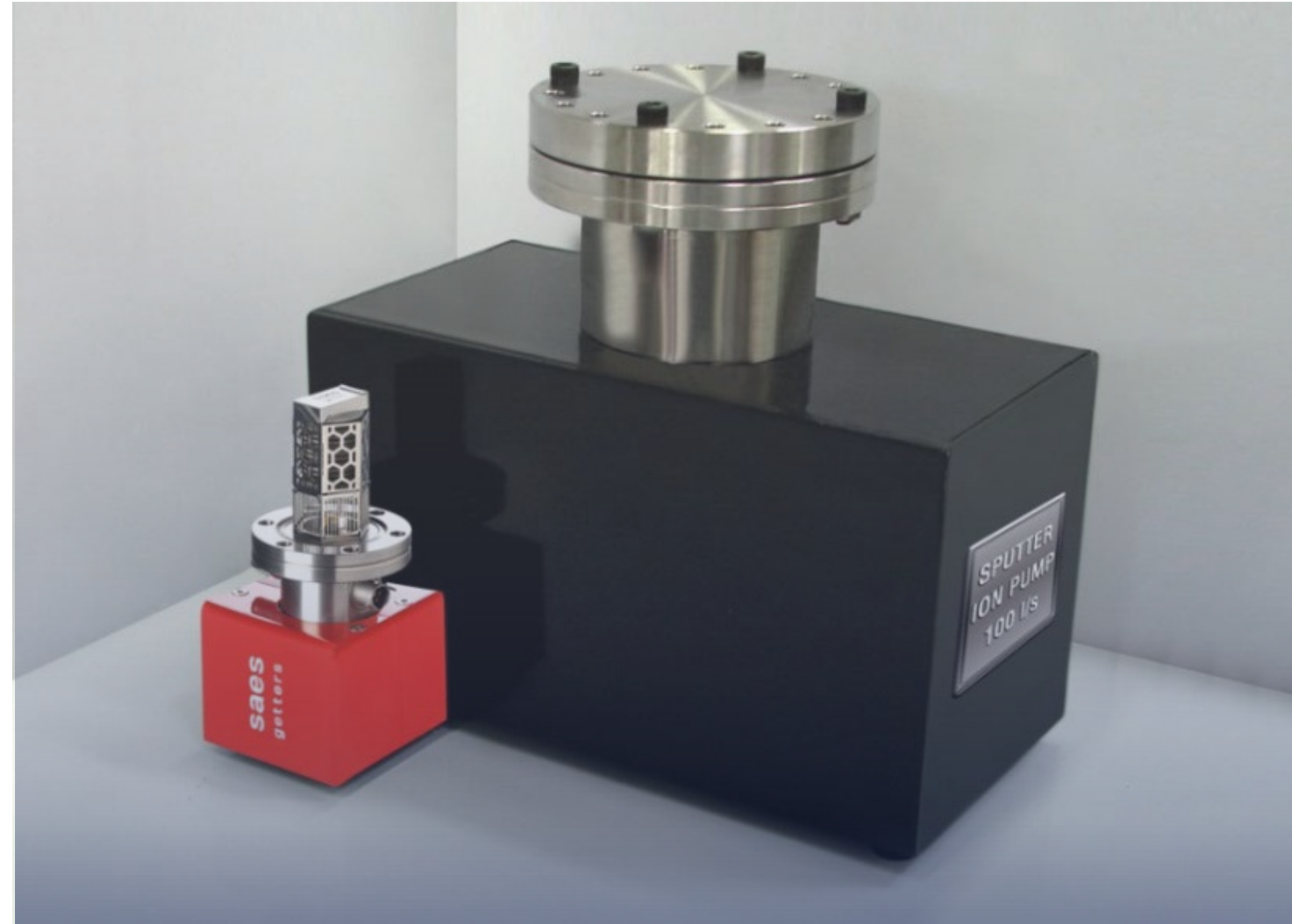
NEXTorr® pump

The **NEXTorr** is a **SAES patented combination** of a NEG pump (Non-Evaporable Getter) with a small SIP (Sputter Ion Pump), mounted on the same flange

The NEXTorr is an **extremely compact vacuum pump**: its weight is only 2.2 Kg, more than 10 times smaller and lighter than a conventional ION pump

Pressure levels down to the $10^{-10}/10^{-12}$ mbar range can be achieved and maintained forever

The SINTERED highly porous NEG material grants huge capacity for low frequency of reactivation



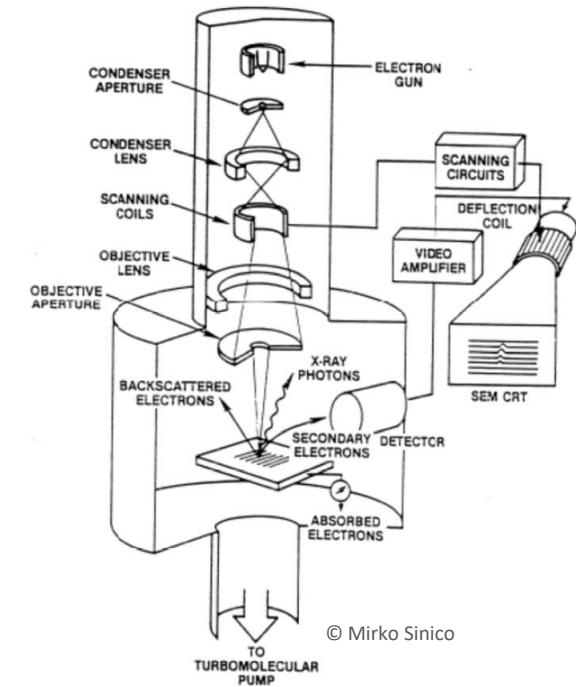
Vacuum chambers in e-beam systems

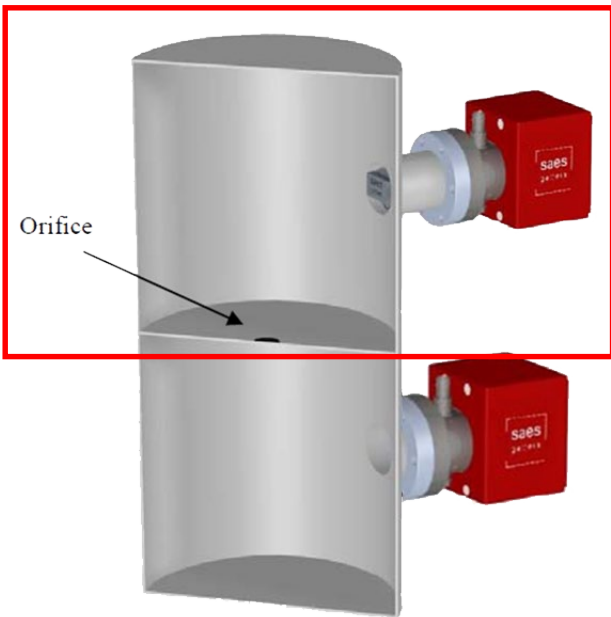
Generally, Field Emission (FE) SEM have 3 vacuum compartments for differential pumping:

- ✓ Gun area (Ultra High Vacuum conditions) - 10^{-10} - 10^{-11} Torr
- ✓ Middle section (high vacuum) – 10^{-7} - 10^{-8} Torr
- ✓ Sample chamber (medium vacuum) – $\approx 10^{-6}$ - 10^{-7} Torr

The **gun chamber** hosts the electron source, which can be a Schottky Emitter, or a Cold Field Emitter

Gun chamber
10^{-10} to 10^{-11} Torr
Middle section
10^{-7} to 10^{-8} Torr
Specimen chamber
10^{-6} to 10^{-7} Torr





NEXTorr Z100/Z200

NEXTorr HV100/HV200

NEXTorr ZAO in e-beam UHV guns

- ✓ **Only 2.2 Kg pump weight**
 - ✓ easy to handle and to install
- ✓ **High pumping rate for H₂ and all gas species**
 - ✓ lower bottom pressure
 - ✓ longer source lifetime
- ✓ **The NEXTorr keeps pumping **without power****
 - ✓ transport the column in vacuum
 - ✓ no need to bake again the gun at user site
 - ✓ faster system installation
 - ✓ quick recovery in case of accidental power cutoff



Courtesy of TESCAN

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NEXTorr ZAO in e-beam middle/sample chambers

Compact and light

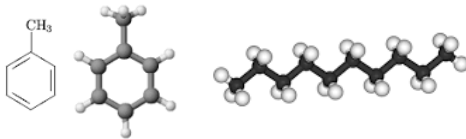
- easy to handle and to install

High pumping speed per volume

- lower bottom pressure

High pumping activity towards hydrocarbons

- less risk of contaminants up to the gun chamber



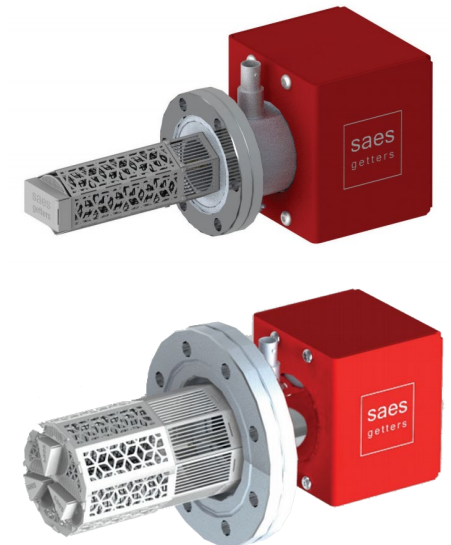
Possibility to stop the Turbo for a few hours per day in the sample chamber

- no vibrations during the image acquisition process

Gun chamber
10^{-10} to 10^{-11} Torr
Middle section
10^{-7} to 10^{-8} Torr
Specimen chamber
10^{-6} to 10^{-7} Torr

NEXTorr HV 200

NEXTorr HV 300



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NEXTorr ZAO in UHV suitcases

Extremely compact and light

- easy to handle and to install

Keeps pumping **without power**

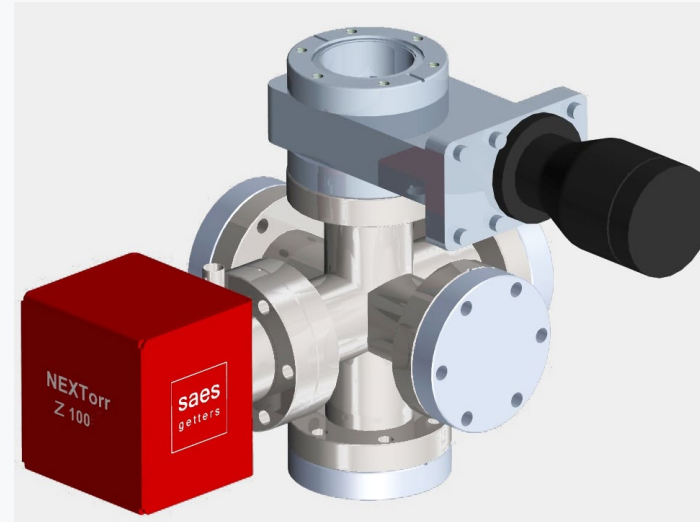
- ideal for in-vacuum transportation

High pumping rate for H₂ and all gas species

- low bottom pressure
- better sample preservation

FERROVAC GMBH
ULTRA HIGH VACUUM TECHNOLOGY

Courtesy of Ferrovac GmbH



UHV suitcase used to transport perovskites samples
in UHV (Gertjan Koster , University of Twente)

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Thank you

for your attention

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