New THIN FILMS LABORATORY

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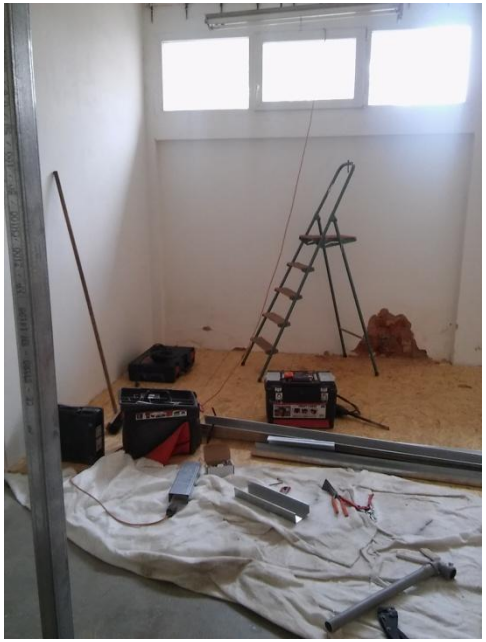
040 – HCD - MNS

026 – MW CVD - NCD

039B – PJ,DC-RF,HF - SENS

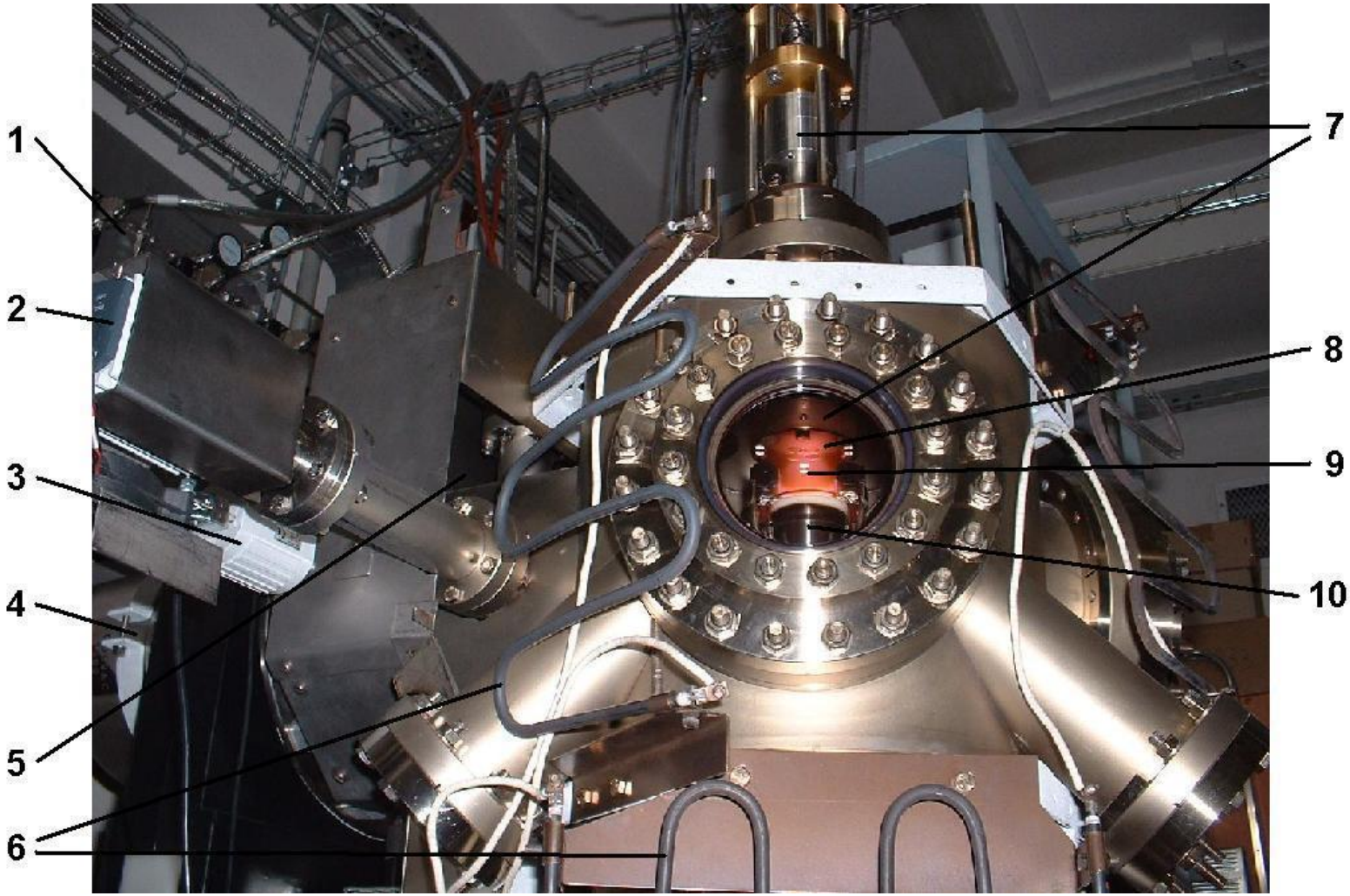
LABORATORY BUILDING - basic construction work



gases distribution, air condition, hood, electro

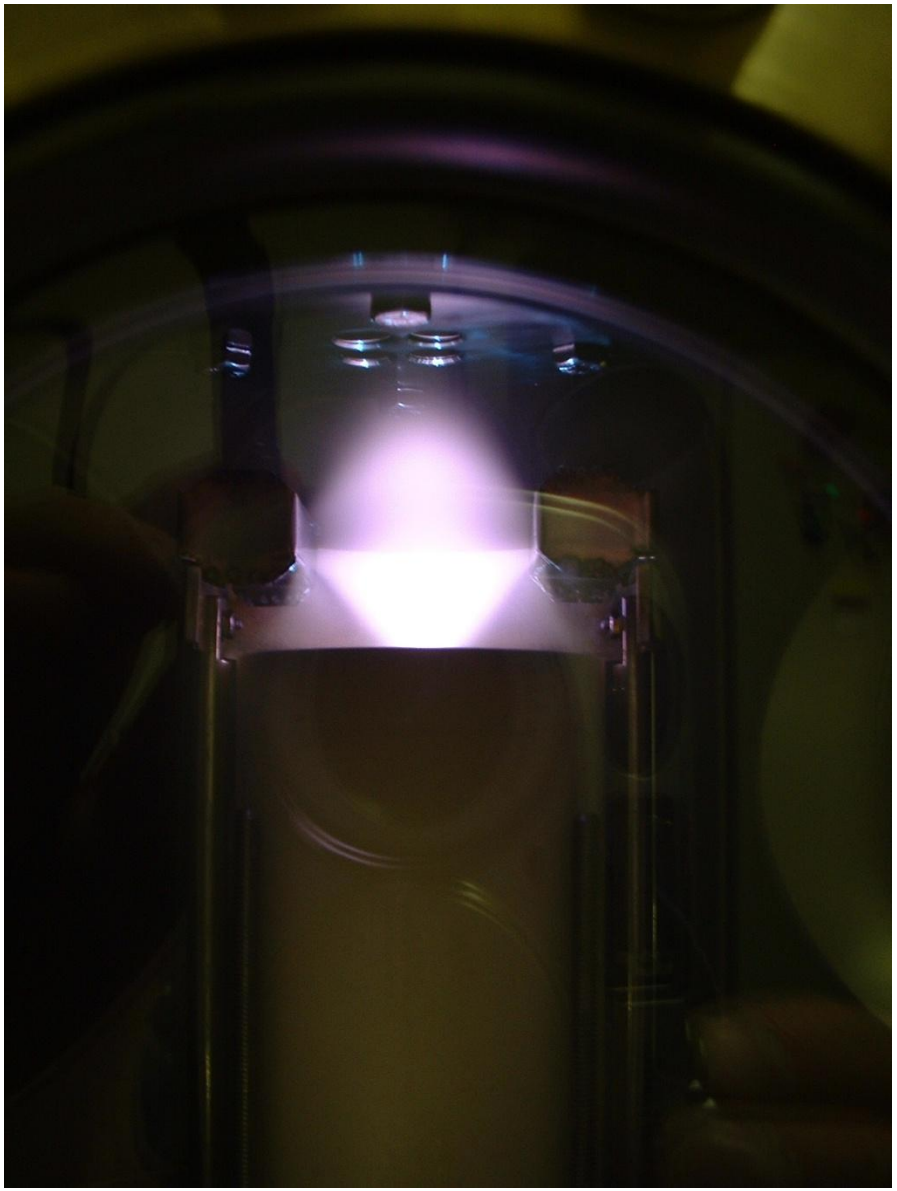
water cooling, detection of gases, air compressor

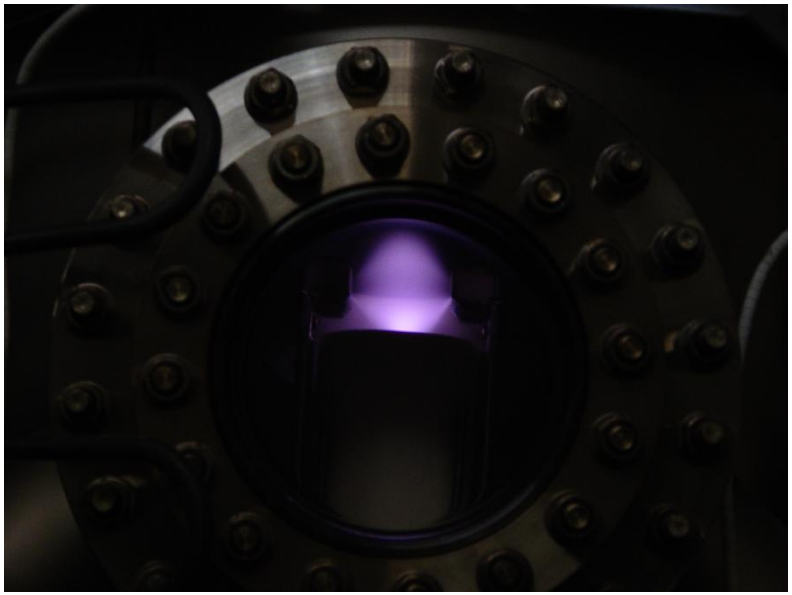
PLASMA JET apparatus

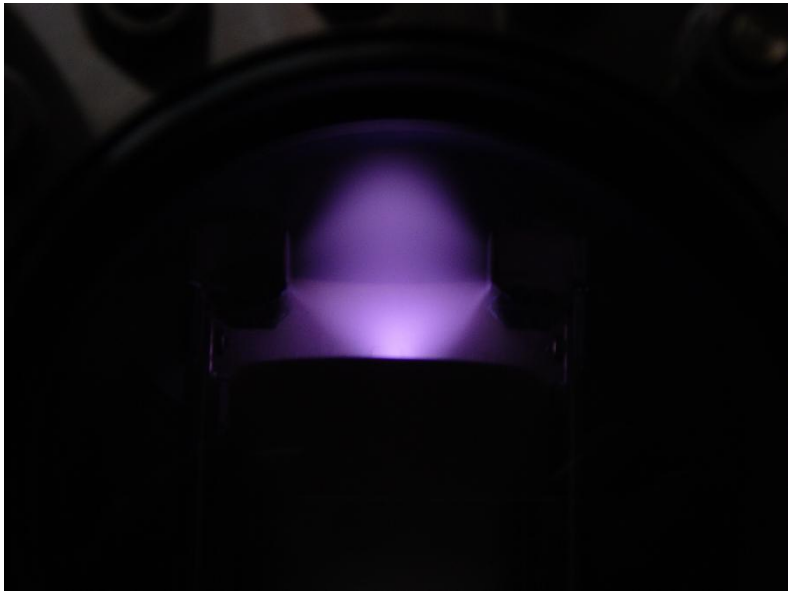


1 – MKS flowmeters in working gases board, 2 – Leybold Combivac pressure gauge, 3 – IT90 pressure gauge, 4 – Leybold Coolvac 1500 cryopump, 5 – VAT control valve, 6 – baking units, 7 – cooled or heated moveable substrate holder, 8 – substrates, 9 – discharge in hollow cathode, 10 – plasma jet body.

DC discharge in the jet during a film deposition







RESEARCH TASKS

Plasma synthesis of novel **materials (films),**
with chemical composition

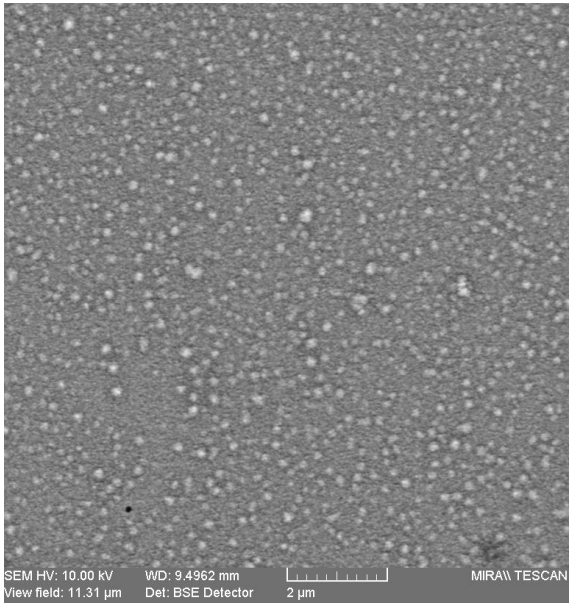
$$\boxed{(FeCo)_p\text{-}(XY)_{1-p}}$$

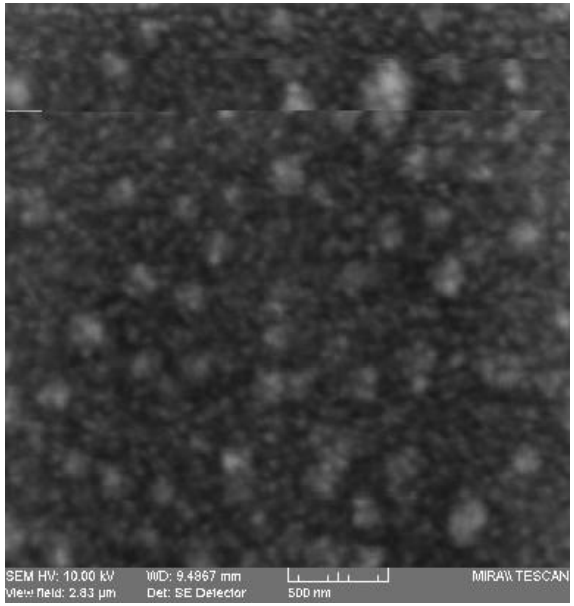
where **X = Hf, Ta, Al, Ti, Si,** etc.
and **Y = O (oxides) , N (nitrides)**

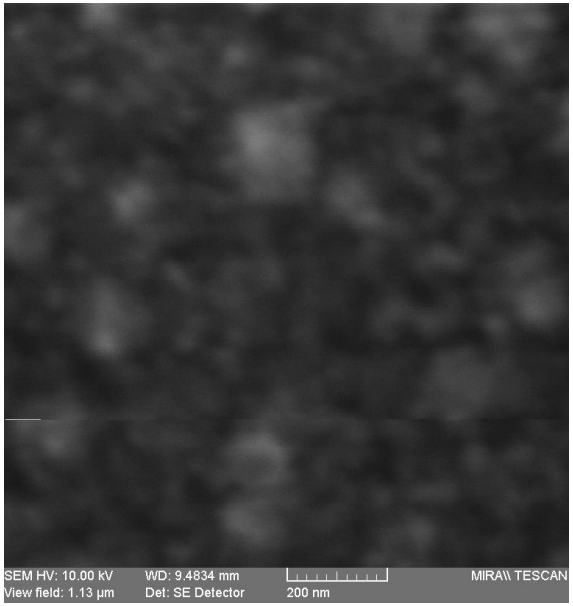
which have an important **industrial applications**, for ratio of
p ~ 30%
in magnetic field sensores or in reading heads of magnetic memories with high density recording,
p ~ 80%
in GHz inductors for mobile communication, where they distinctively suppress the eddy currents energetic losses .

Nanostructured films FeCo - AlN

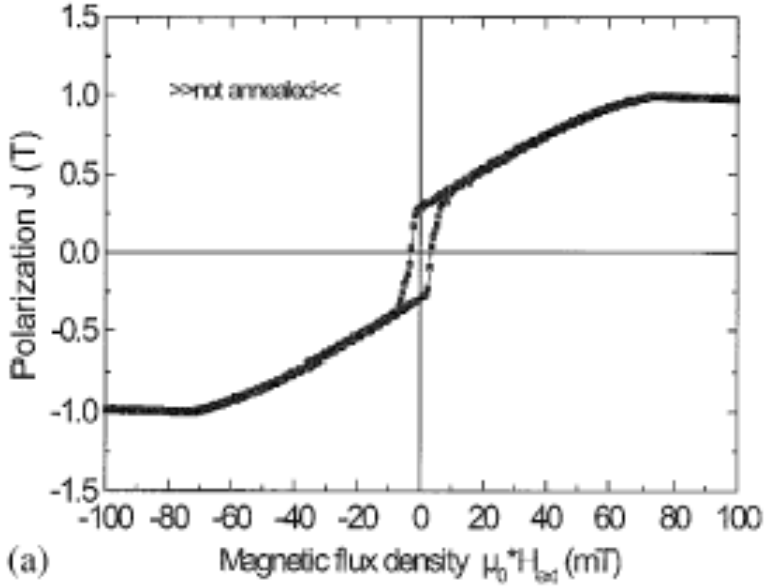
SEM (Scanning Electron Microscopy)







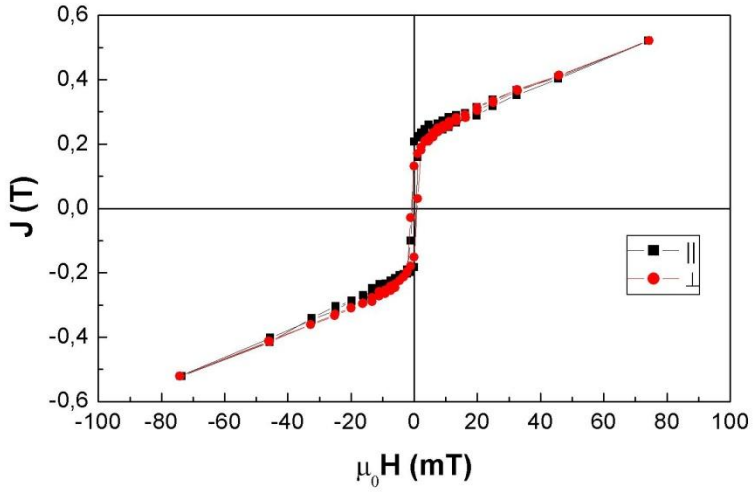
Magnetic nitrides FeCo - AlN (for GHz inductors in mobile communication)



Hysteresis loop of magnetic soft film FeCo-AlN deposited by magnetron in the **Forschungzentrum Karlsruhe**, **Helmholtz-Gemeinschaft, BRD, Klaus Seemann Group**

coercivity $\mu_0 H_C$ = **3,0 mT**

Sample: FeCoAlN.04d/Si without background correction



Hysteresis loop of magnetic soft film FeCo-AlN deposited by the **originally constructed UHV apparatus in the IP AC CR, Prague**

coercivity $\mu_0 H_C$ = **0,7 mT**