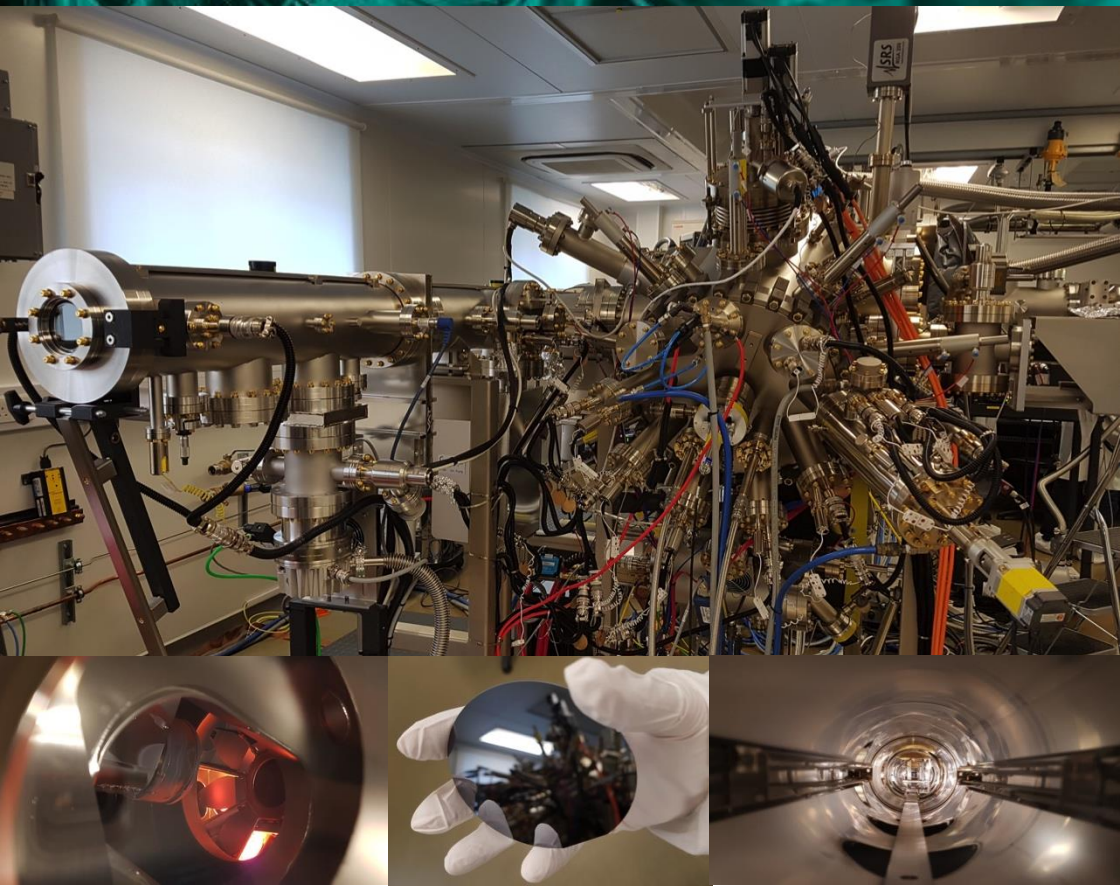
NATIONAL EPITAXY FACILITY

EPSRC
Engineering and Physical Sciences Research Council

Universities of Sheffield
Cambridge &
University College London

Group-IV Molecular Beam Epitaxy

Capabilities



EPSRC National Epitaxy Facility
Molecular Beam Epitaxy Facility
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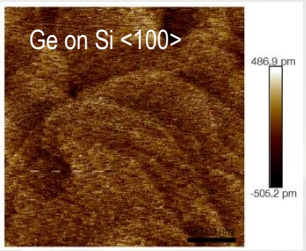
The National Epitaxy Facility plays a central role in enabling UK University research through provision of high quality Semiconductor Epitaxy for custom designed structures and devices. The facility has expanded from the provision of III-V materials and devices to include group IV epitaxy and hybrid III-V/Group IV epitaxy. The group IV epitaxy and hybrid III-V/Group IV epitaxy is provided by a unique dual-chamber III-V/Group IV molecular beam epitaxy (MBE) system at University College London. The group IV system is equipped with two Ge cells, a Sn cell and an e-beam evaporator for Si as well as B, Sb and P for doping. The III/V system has two Ga, two In and two Al cells, As and P crackers as well as Be and Si dopant cells.

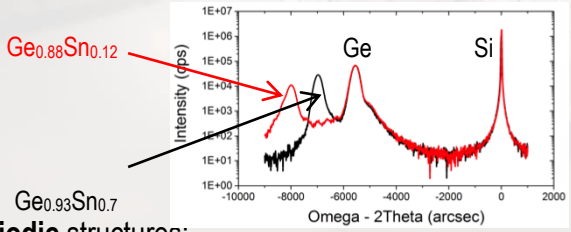
Group-IV and Hybrid III-V/Group IV Capabilities

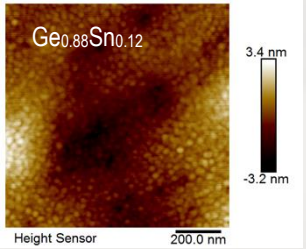
Buffers:
Si and Ge on Si substrates.

500nm Ge on Si
RMS roughness:
1μm^2: 0.174 nm
25μm^2: 0.76 nm
100μm^2: 1.28 nm



Bulk structures:
Si, Ge and GeSn, doped with B or Sb.





Periodic structures:
Si/Ge(Sn), SiGe/Ge, Ge/GeSn superlattices and multiple quantum wells (MQW).

Quantum confinement structures:
Strained Ge quantum wells, Ge quantum dots, Ge nanowires.

GaAs/Ge core-shell NWs