Cryogenic ion trap to study cold and controlled ion-radical reactions

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New optical system

Image of a Ronchi ruling with 100 lines per mm

With the Ronchi ruling and the first off-axis parabolic mirror situated outside of the chamber, at room temperature

With the Ronchi ruling and the first off-axis parabolic mirror situated inside the chamber, at cryogenic temperatures

Distance between neighbouring ions in a Coulomb crystal is ~10–20 µm

Cryogenic system

• First stage cold shield: 60 K
• Second stage cold shield and ion trap: 9 K

Next steps

• Generating calcium Coulomb crystals
• Once Ca⁺ Coulomb crystals have been formed: attach the Zeeman decelerator and magnetic guide
• First ion-radical target reaction: N₂⁺ + H

References