SIS100
laser cooling facility

Danyal Winters

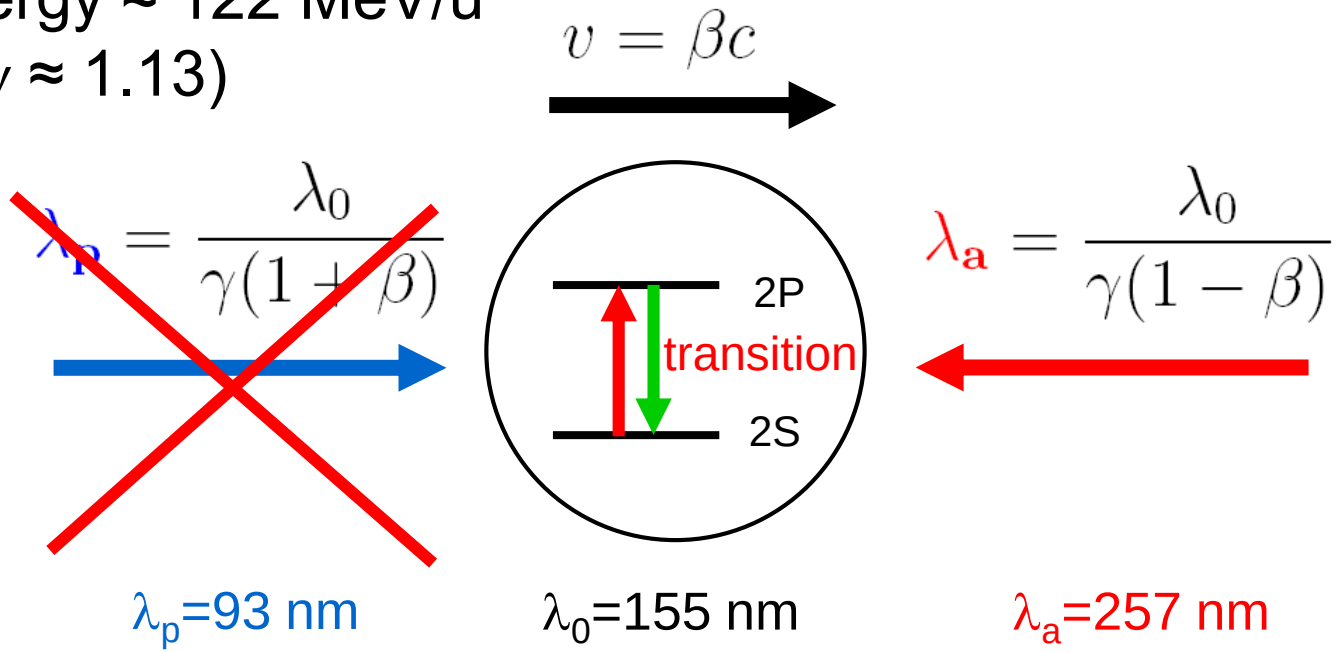
GSI Helmholtzzentrum, Darmstadt

The principle: laser cooling of stored bunched relativistic ions

ESR example:

C^{3+} ion energy ≈ 122 MeV/u

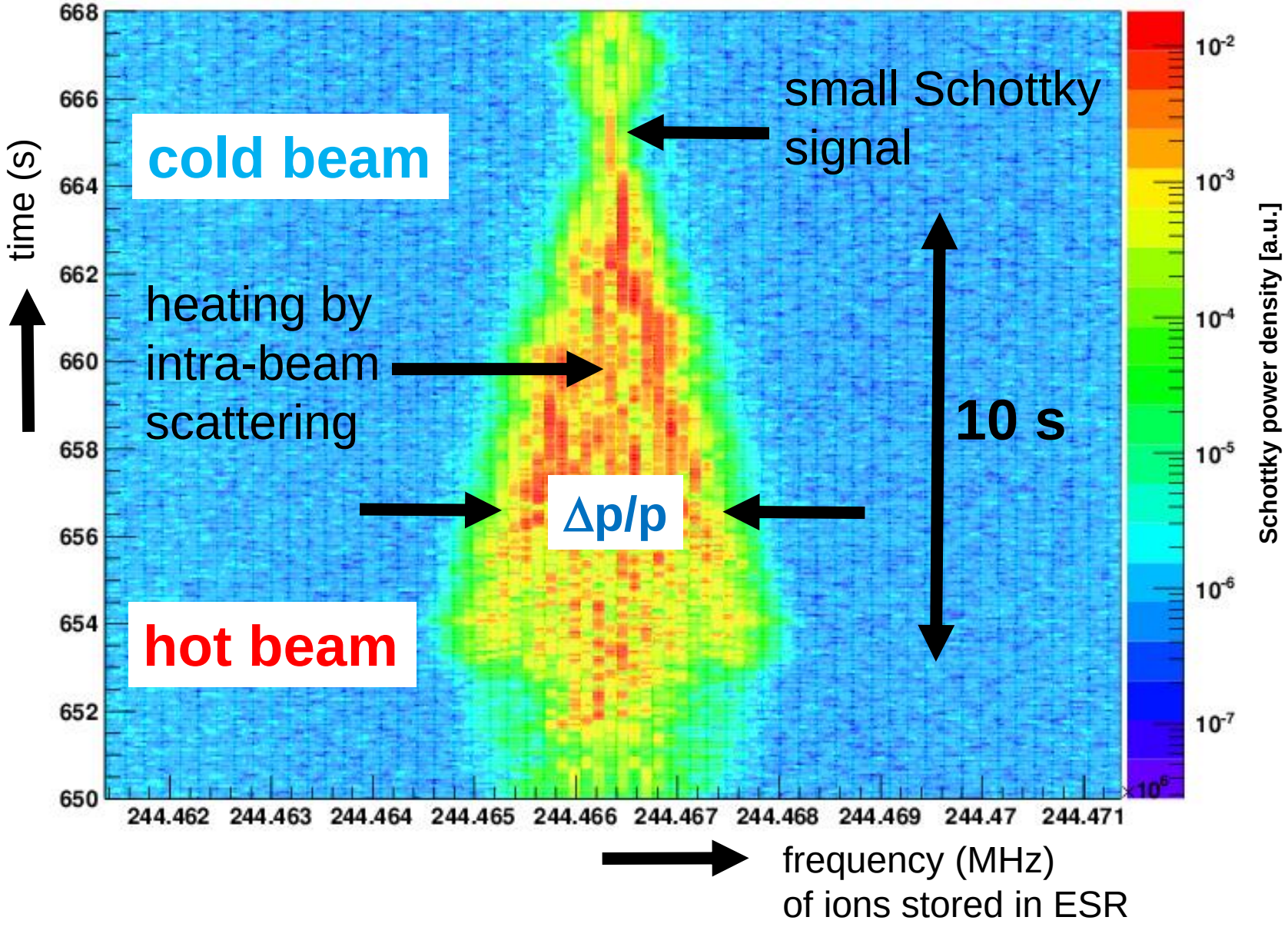
(β ≈ 0.47, γ ≈ 1.13)



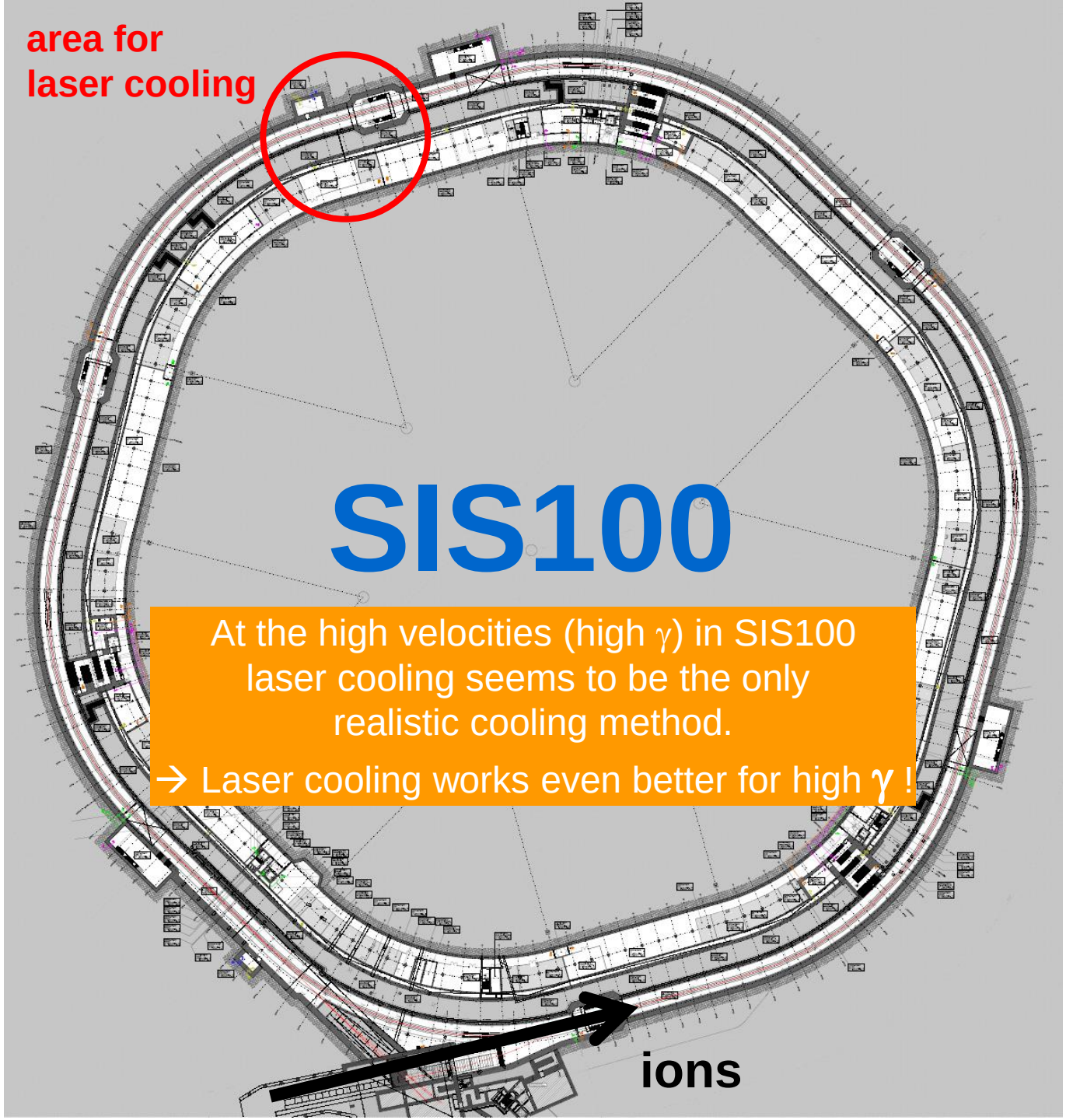
The ion absorbs many directional momenta from the photons and decays each time with a random recoil, averaging out to zero.

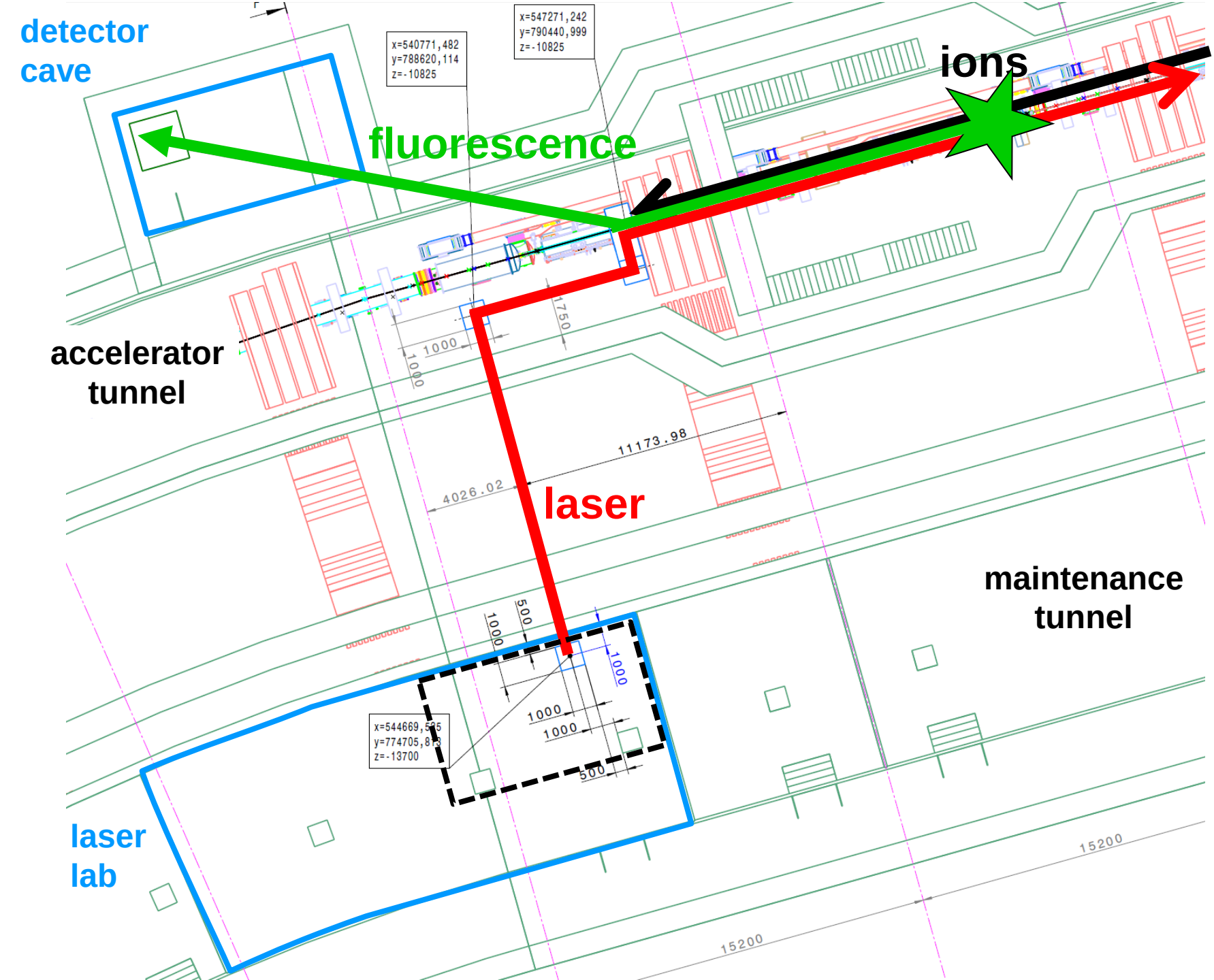
In our case, the cooling laser force is counteracted by the restoring force of the `*bucket´* when **the ion beam is bunched**.

C^{3+} ions stored in the ESR, 122 MeV/u, scanning the laser frequency



2012 ESR data


area for
laser cooling
SIS100
At the high velocities (high γ) in SIS100
laser cooling seems to be the only
realistic cooling method.
→ Laser cooling works even better for high γ !
ions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accelerator
tunnel
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4026.02
laser
maintenance
tunnel
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500
1000
1000
1000
500
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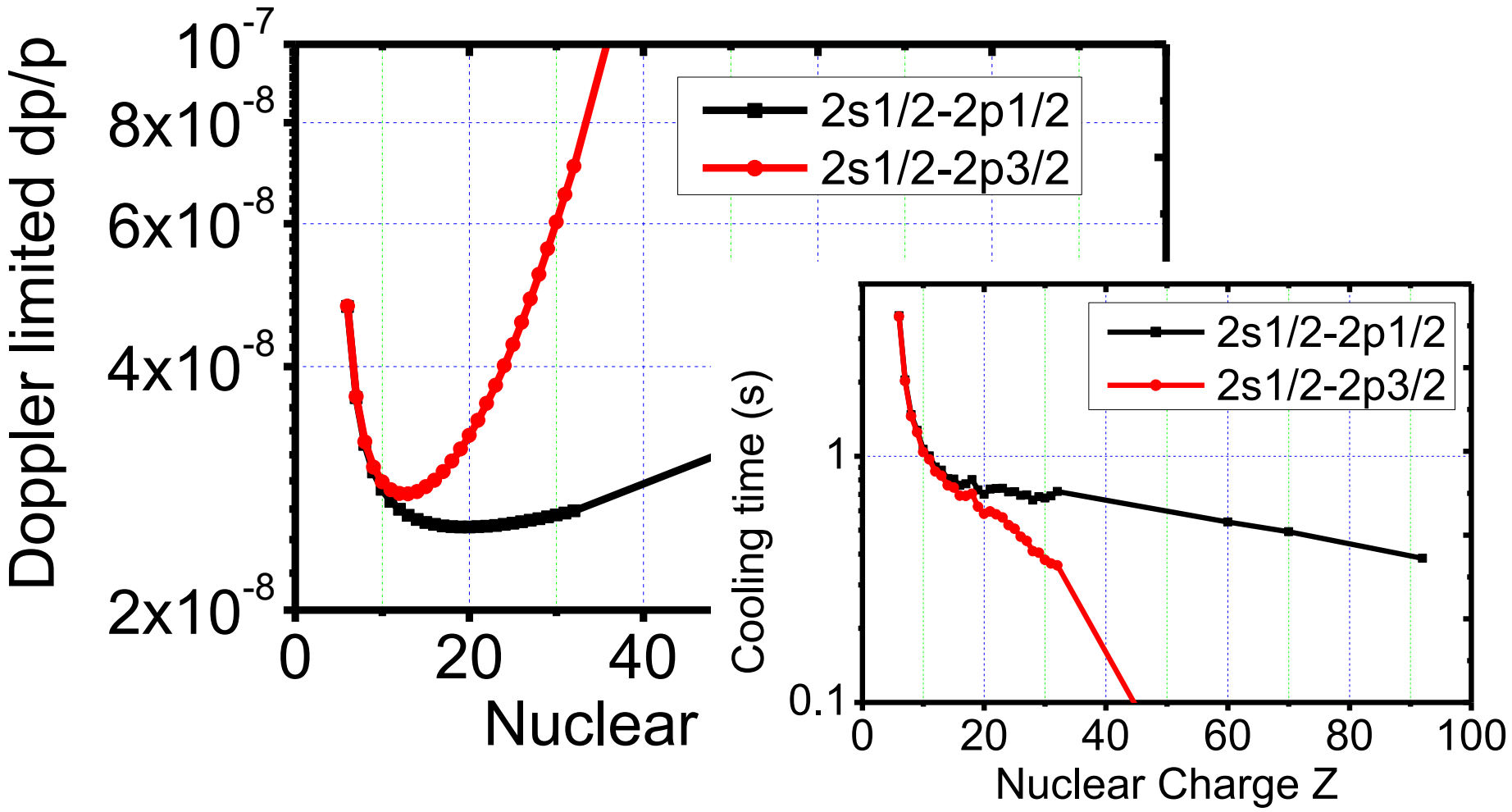
laser
lab
15200
15200

What could we (naively) expect if everything would be ideal?



W. Wen
M. Bussmann

preliminary results for Li-like ions!