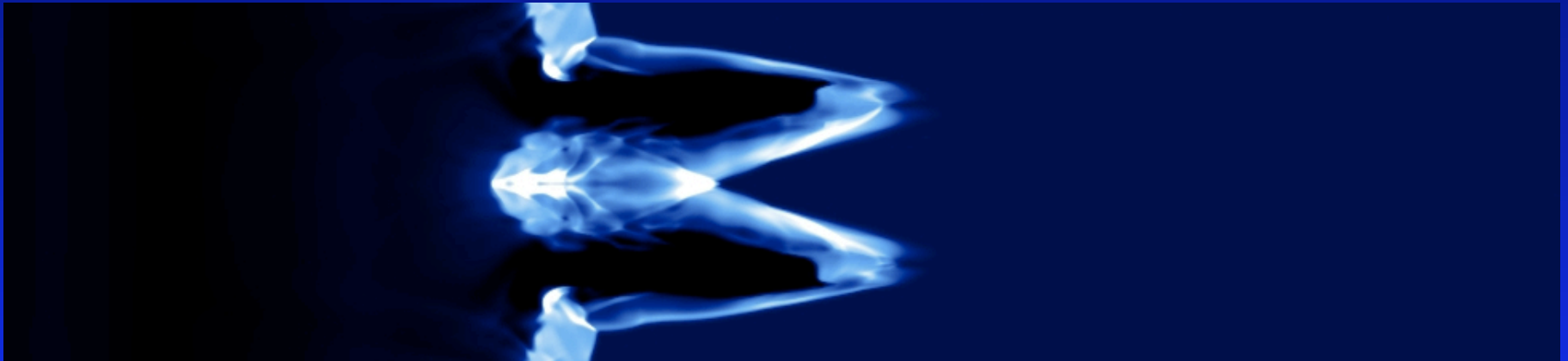


Export Controls on Astrophysical Simulation Codes

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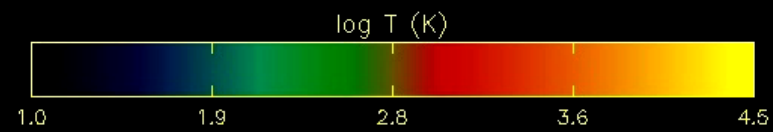
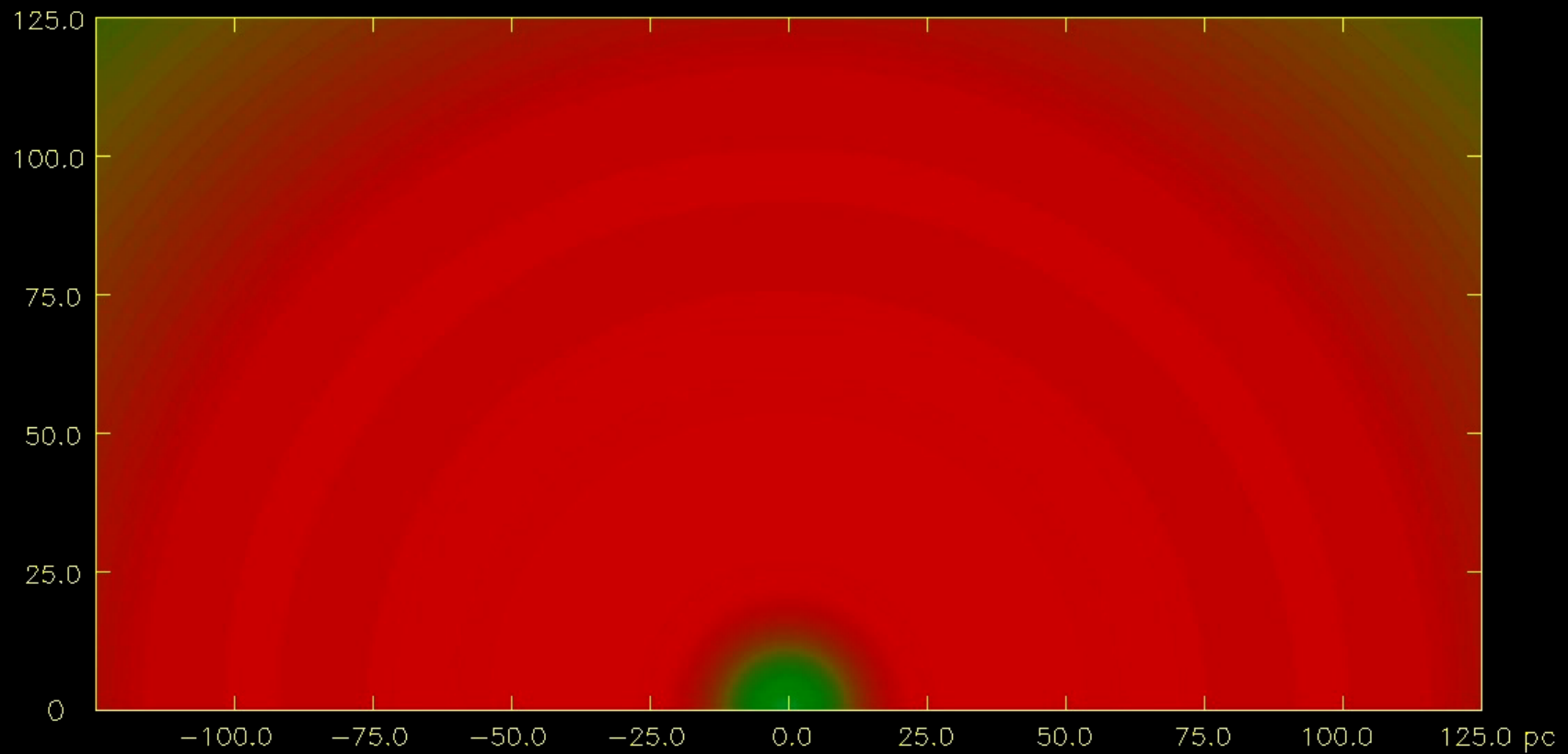
225th AAS Meeting, Seattle, Jan 6, 2015

Why Export Controls?

- mostly to prevent the development of nuclear weapons
- numerical codes in principle are not needed to develop fission bombs (although they would certainly help)
- simulation is essential to development of thermonuclear weapons

How do Foreign Intelligence Agencies Collect Information?

- they cast a broad net, assembling the entire puzzle one piece at a time
- they also send students for training overseas
- Pluto code



$n_c = 1596 \text{ cm}^{-3}$
 $r_{\text{sep}} = 150 \text{ pc}$
 $t = 0.0 \text{ Kyr}$

Hueckstaedt & Whalen 2009

2D Halo Photoevaporation

Uncontrolled Nuclear Information (UCNI)

- any high-order radiation transport scheme coupled to a shock-capturing hydro scheme
 1. S_N methods
 2. P_N methods
 3. Variable Eddington Tensor Formalism (VETF) schemes
 4. Implicit Monte Carlo (IMC)
- can only be run on designated open systems
- foreign nationals cannot have access to source code

Federal Rules are Evolving

- there is a push to relax the rules on UCNI to allow more sophisticated radiation transport schemes to run on open systems
- much of this push is coming from the algorithm development groups at the national labs
- it's becoming more understood that the really sensitive information is the data that the codes use
- but bureaucratic change is slow, may happen in the next 10 years