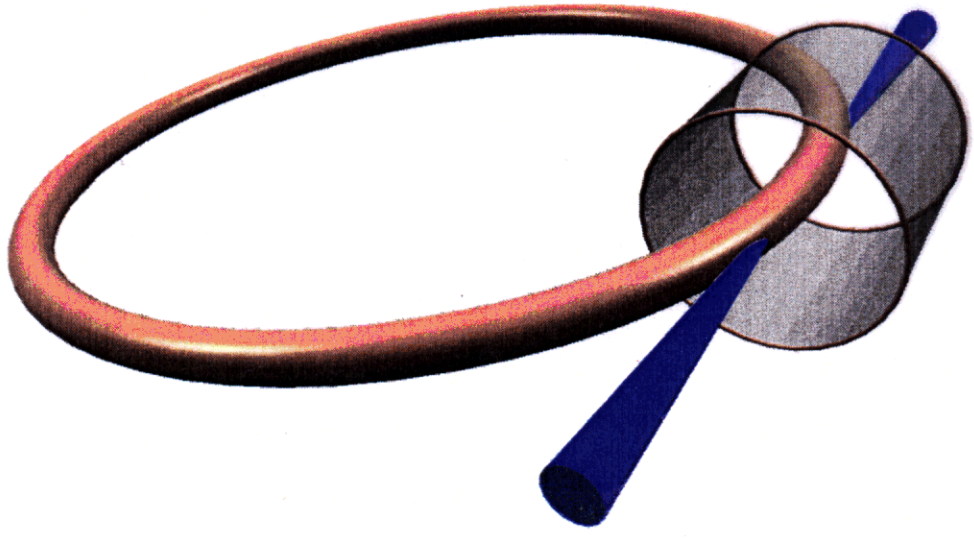
Accumulative effect - "pulse pile up"

Fresh target for each pulse

— Liquid Jet
(evaporable)
— Rotating band
(direct water cooled)
— Rotating toroidal ring
(σT^4 cooling)



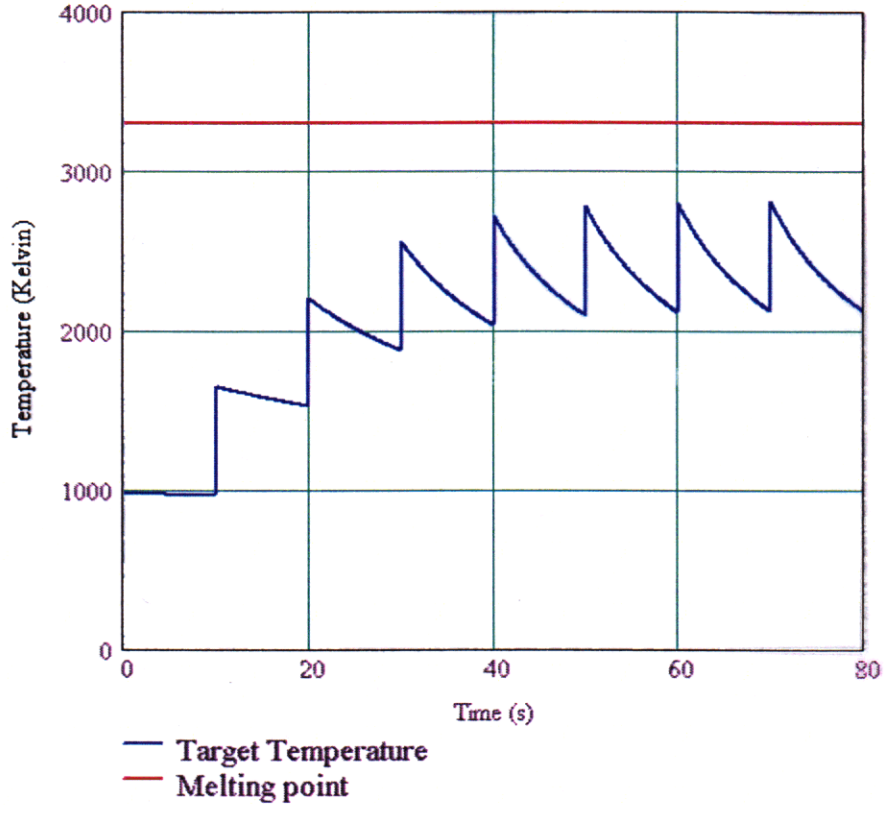
Paul Drumm
Rutherford Appleton Laboratory
May 2000

CLRC

Pulsed operation at 10 Hz

Ring diameter — 6.5 m ⇦ min to get rid of power

Ring speed — 2 m/s ⇦ pulse spacing/target length



Average power in target 1 MW

ΔT per pulse ~ 700 degrees ⇨ large

⇨ Shock effects important

ISIS

Paul Drumm
Rutherford Appleton Laboratory
May 2000

Solution:

Rotating Toroid Target

Radiatively Cooled

Magnetically Levitated

Magnetically Driven

Problems:

Shock Effect

Eddy Current Generation

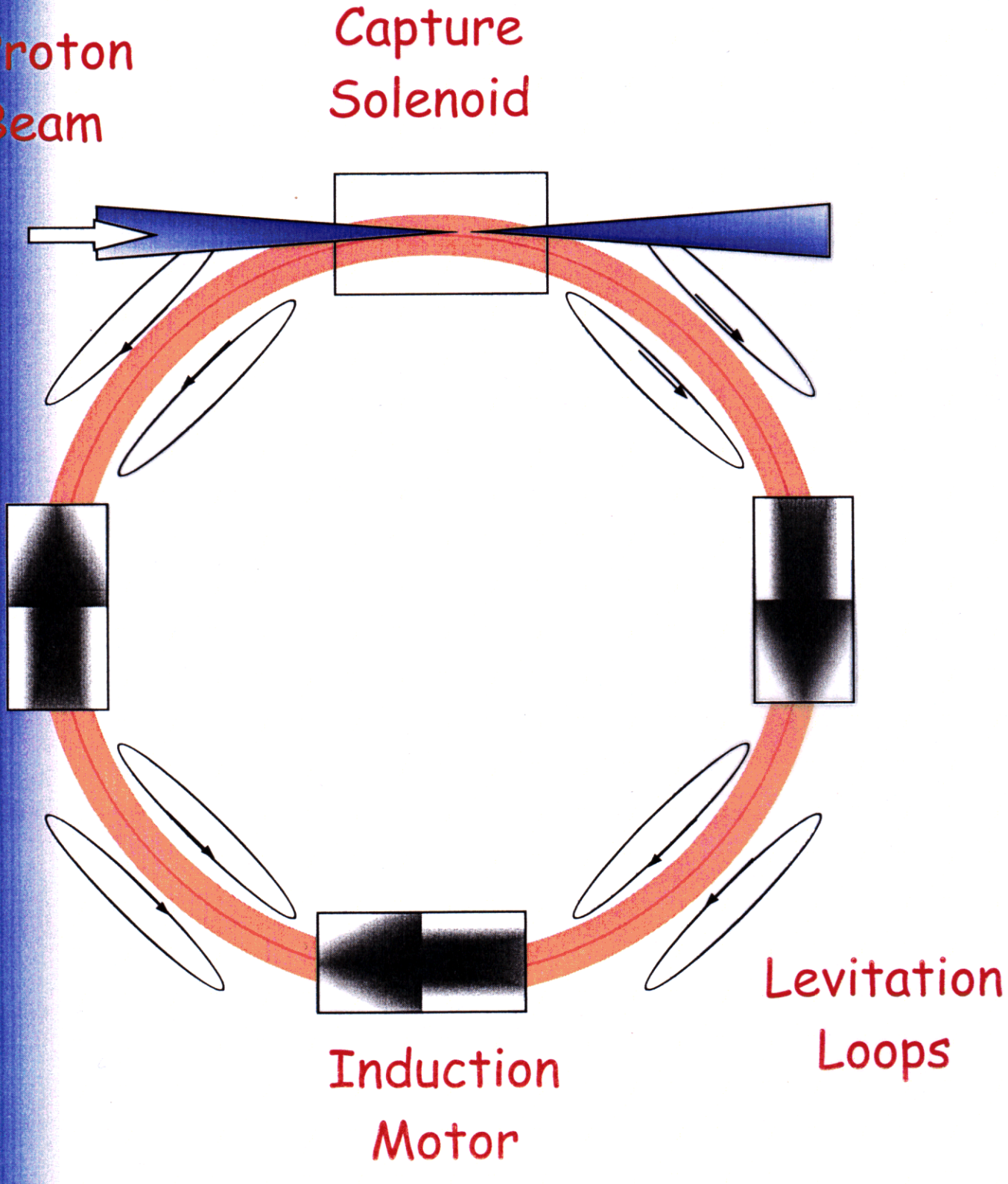
Levitation/Drive Technology

ISIS

Paul Drumm
Rutherford Appleton Laboratory

CLRC

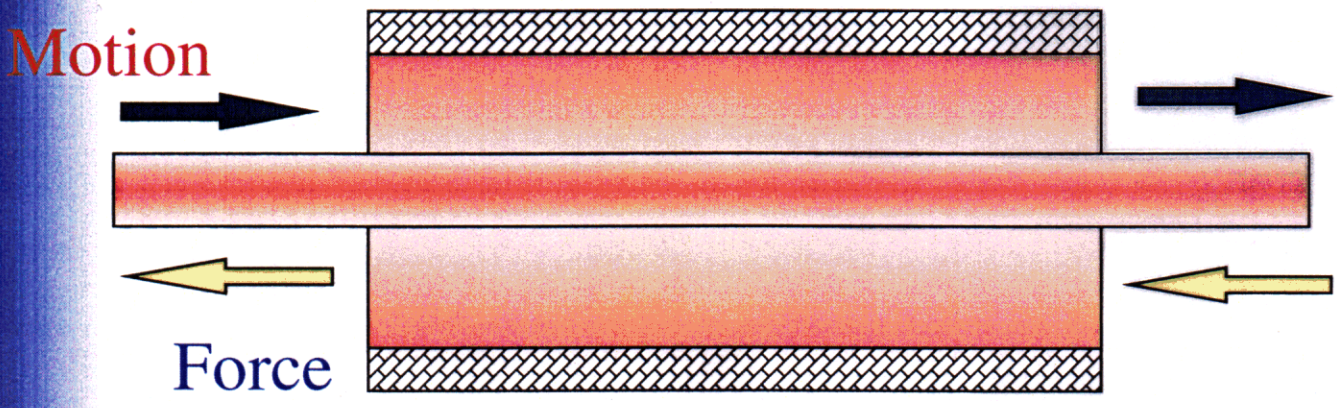
Integrated System



ISIS

Paul Drumm
Rutherford Appleton Laboratory
May 2000

Magnetic Brake - The 20 T solenoid



As the induction motor pushes

the solenoid pushes back

Estimated Eddy current losses in the target

~ 20 kW

Forces exerted on the hot tantalum cause compression and distortion of the target.

These forces are large !

Paul Drumm
Rutherford Appleton Laboratory
May 2000