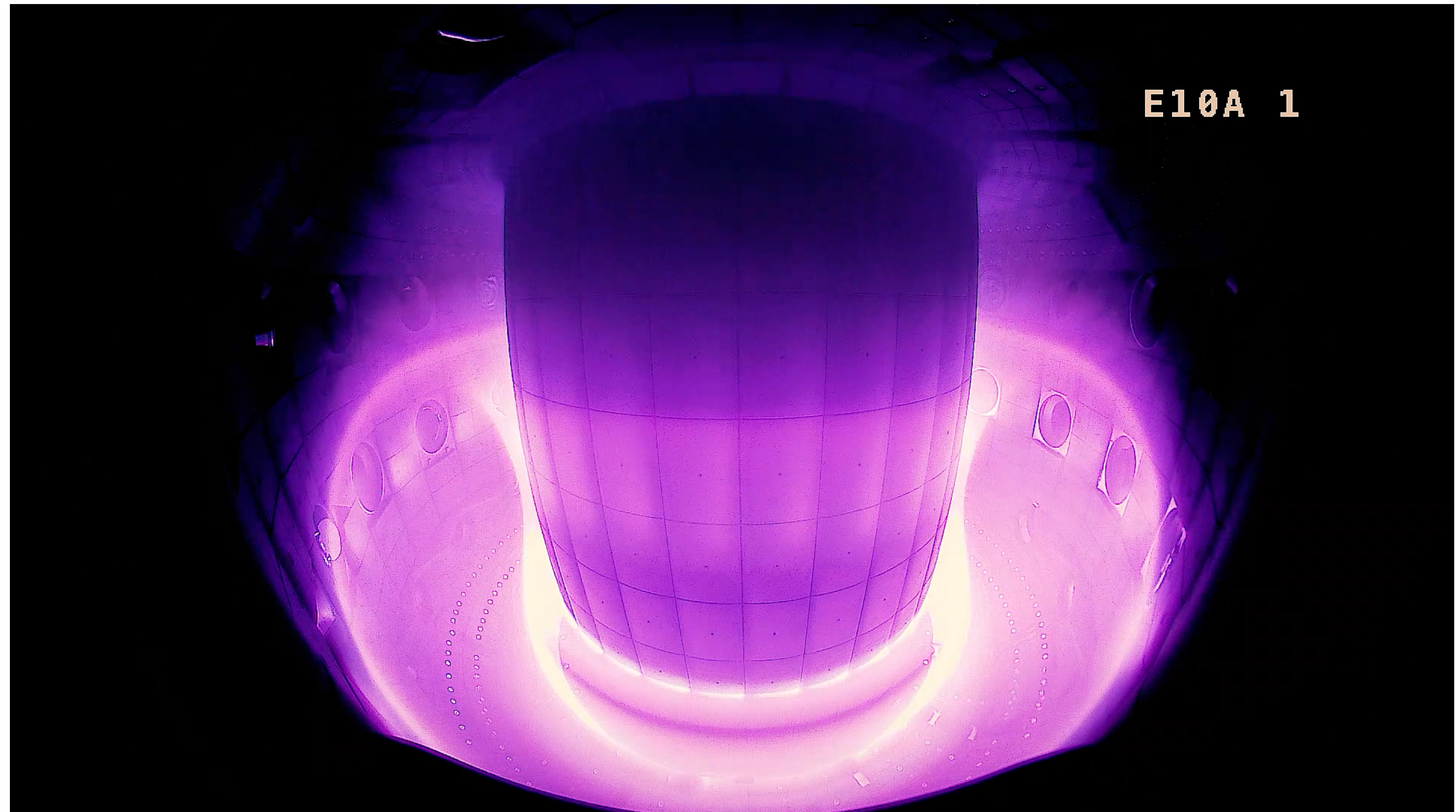


General Physics: Mechanics

PHYS-101(en)
Lecture 10b: Collisions

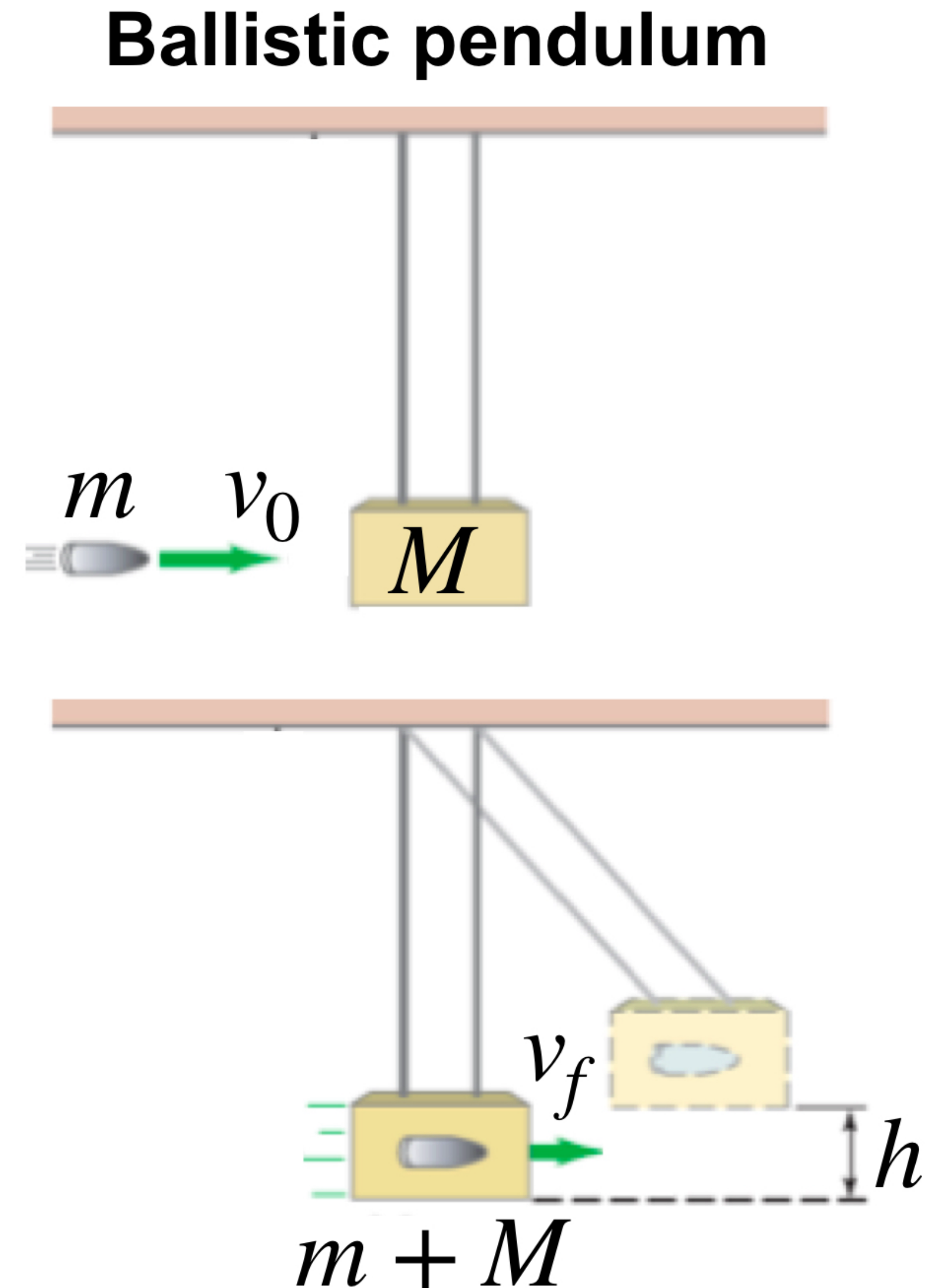
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How to measure the speed of a bullet

Any projectile, of mass m , is fired into a large block of mass M , which is suspended like a pendulum. As a result of the collision, the pendulum and projectile swing up together to a maximum height h .

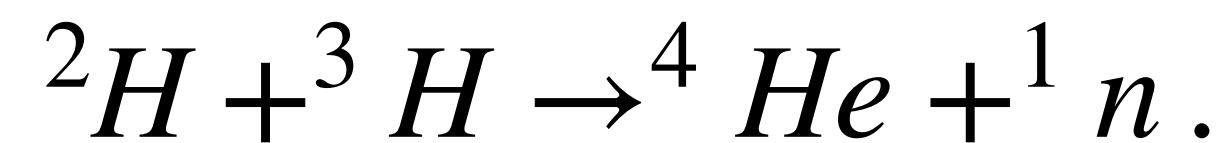
Calculate the initial horizontal speed of the projectile v_0 from the maximum height h .



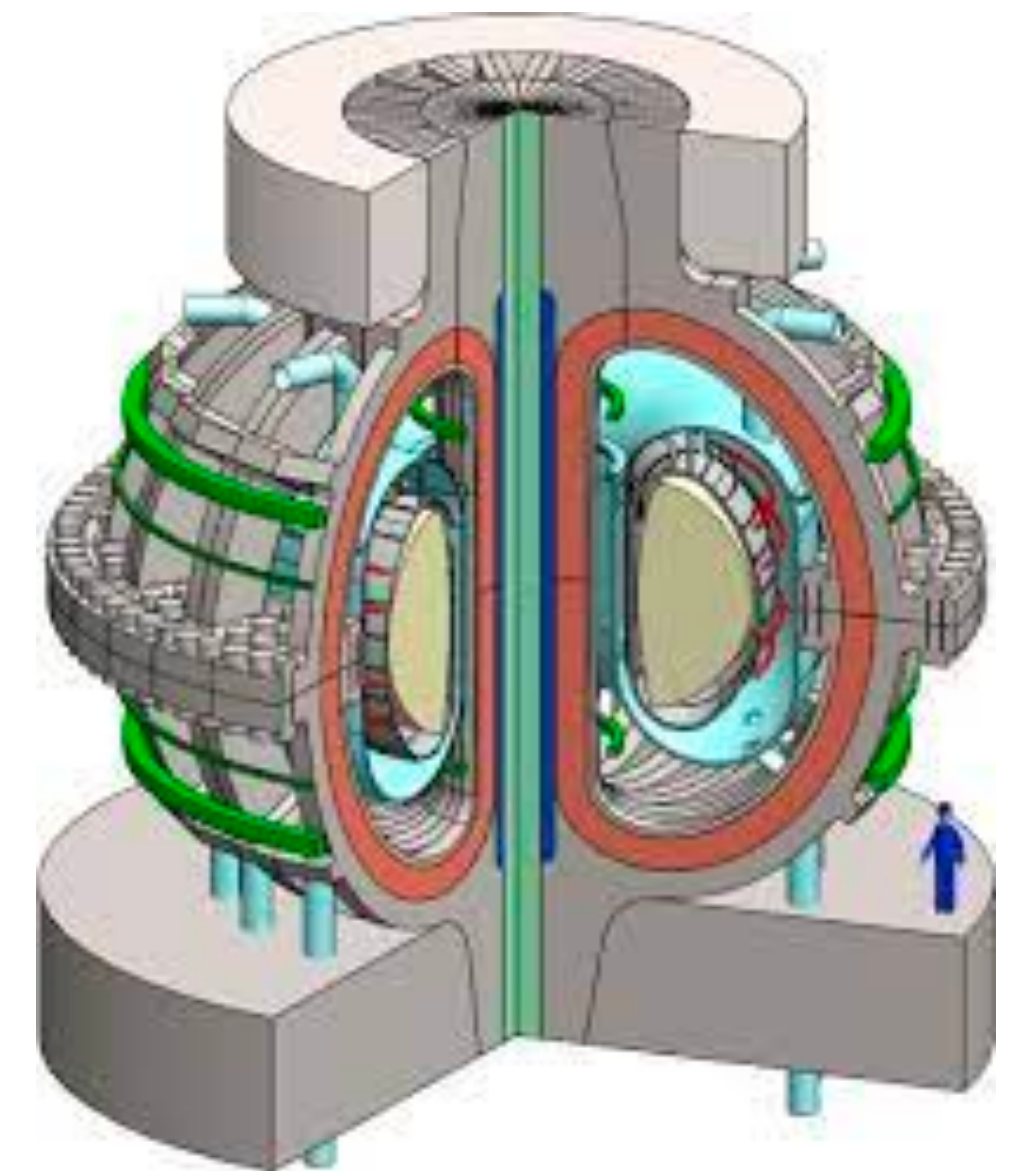
How to measure the speed of a bullet

Example: Fusion reactions

In a fusion reactor, isotopes of hydrogen are confined as they are heated to temperatures exceeding those of the sun (i.e. 100 million Celsius = 0.01 MeV) in order to enable the fusion reaction



This reaction is inelastic as it releases $Q = 17.6$ MeV of energy, which is carried away in the form of the kinetic energy of the products. If the ${}^3\text{H}$ particle is at rest and the ${}^2\text{H}$ particle has 0.01 MeV of kinetic energy, how much energy does the neutron end up with?



Hints:

- You can still write down a version of conservation of energy, but you need to consider all the types of energy involved
- Look for an approximation that simplifies the problem significantly and barely affects the final answer

Example: Fusion reactions

Example: Fusion reactions
