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(a) Two relativistic particles with equal rest masses m have total energy E in the laboratory (lab) frame in which one is at rest. In their center of mass (CM) frame, their total energy is E_{CM}. Find E in terms of E_{CM} and m.

(b) A proton and an antiproton, each with rest mass m_p, collide to produce a W^+W^- pair, each particle with rest mass $m_w > m_p$. Find the minimum (threshold) energy to produce the two Ws, as measured in the (i) CM and (ii) lab frames, respectively.

(c) Find the velocity of the incident antiproton in the lab frame at threshold for the collision described in part (b).

(d) Find the velocities of the W^+ and W^- in the lab frame at threshold for the collision described in part (b).