38.3 Given (by 38.68) $\Delta E = \frac{4\pi}{3}\frac{e^2}{R}\beta^3\left(\frac{E}{mc^2}\right)^4$, and $\beta \simeq 1$

+2/2

$\Rightarrow \Delta E = \frac{4\pi}{3}\frac{e^2}{\hbar c}\cdot\frac{\hbar c}{(mc^2)^4}\left(\frac{E^4}{R}\right)$

Note $\hbar c = 197\ MeV\cdot fm = 197\ MeV\left(\frac{1.602\cdot 10^{-13}\ kgm^2/s^2}{MeV}\right) fm\cdot\frac{m}{10^{15} fm}$

$= 3.16\cdot 10^{-26}\ J\cdot m$

Note $\frac{e^2}{\hbar c} \cong \frac{1}{137}$

$m = 9.11\cdot 10^{-31} kg$, $c = 3\cdot 10^8 m/s^2 \Rightarrow (mc^2)^4 = 4.52\cdot 10^{-53} kg^4 m^8/s^8$
$= 4.52\cdot 10^{-53}\ J^4$

$\Delta E = \frac{4\pi}{3}\frac{1}{137}\frac{3.16\cdot 10^{-26}\ J\cdot m}{4.52\cdot 10^{-53}\ J^4}\left(\frac{E^4}{R}\right)$

$= 2.14\cdot 10^{25}\frac{m}{J^3}\left(\frac{E^4}{R}\right) = 8.85\cdot 10^{-5}\frac{m}{GeV^3}\left(\frac{E^4}{R}\right)$

Assuming R is in meters, and E is in GeV, we can convert ΔE to MeV by multiplying by 10^6

$\therefore$ $\boxed{\Delta E(keV) = 88.5\ keV\left(\frac{m}{GeV^4}\right)\left(\frac{E(GeV)^4}{R(m)}\right)}$

... this is an odd problem!