EURIQA unit for DC potential

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Units

The length and voltage units are such that electric potential that creates 1MHz trapping frequency for Yb171 has the form x^2/2, and the electric potential between two ions is 1/r.

More explicitly, the voltage unit is about 525.39 uV and the length unit is about 2.7408 um.

Potential Terms

The convention for the DC potential terms follows this unit.
The explicit functional form (in EURIQA unit) for each of the polynomial terms follows the expression
x^l y^m z^n / l! / m! / n!. The X2 and Z2 terms additionally needs to make sure the Laplace equation is satisfied by mixing in other quadratic forms. The explicit expression for each terms are
X1: x
X2: x^2/2 - y^2/4 - z^2/4 (This makes sure the anti-confinement in Y and Z from the X2 term is symmetric)
X3: x^3/6
X4: x^4/24
QXY: xy
QZX: zx
QZY: yz
QZZ: z^2/2 - y^2/2 (This is make sure there's no effect on the axial potential and it's a simple rotation from QZY)
X2Z: x^2z/2 (This is the term that breadboard cannot compensate but we might be able to)

As an example, the functional form of 1 unit of X4 term is: (x/274.08um)^4 / 24 * 525.39uV