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Symbolic Interpretation

A : cantilever oscillation amplitude

A_{exc} : excitation amplitude

D : minimum position between tip and sample

E : an electron energy

F : force

F' : force gradient

F_{chem} : chemical forces

F_{cone} : cone of electrostatic force

F_{vdw} : Van der Waals force

F_{el} : long-ranged electrostatic force

$F_{tr\text{-}cone}$: truncated-cone of electrostatic force

H : Hamaker constant

h : tip height of the cantilever

l : length of the tip

m : electron mass

m^* : effective mass

P_z : momentum in z direction

Q : damping voltage

R : radius of apex model

R_s : radius of spherical model

U : potential

U : effective potential difference

V_{cp} : contact potential

V_{cpd} : contact potential difference

V_{mcp} : mean contact potential

V_{ts} : ptential energy between tip and sample

V_t : applied tip bias

V_{sample} : applied sample bias

x : x direction

$\mathbf{y}$: y direction

$\mathbf{z}$: z direction

$\boldsymbol{Z}$: relative distance

z : average tip-sample distance

Δf : frequency shift

Δz : apparent z-height differences

$\Delta \boldsymbol{\Phi}$: work function difference

k : spring constant

f_0 : cantilever free oscillation frequency

$\boldsymbol{e}_0$: vacuum permittivity

$\boldsymbol{r}$: number of atoms per unit volume

$\boldsymbol{q}_{tip}$: cantilever full cone angle

$\boldsymbol{q}_{lever}$: angle of cantilever respect to sample surface

Φ_{tip} : work function of the tip

Φ_{sample} : work function of the sample