This program executes a calculation of selective photoionization of a target isotope as powers of lasers are varied. The governing equations and units of calculation are displayed in other links EQUATIONS and UNITS of Yb.

Input data file has the following structure :

parameters	note
λ_1, λ_2, λ_3 (nm, in air)	Wavelengths of first, second and third transition lasers
τ_{d1}, τ_{d2}, τ_{d3} (nsec)	Delay of the lasers
T_1, T_2, T_3 (nsec)	Pulse widths of the lasers
τ_2, τ_3 (nsec)	Decay time of the first and the second excited levels
P_{tot} (W), $P_1 : P_2 : P3$	total power and the ratio of powers of the excitation lasers
b_a, b_a (GHz, f), $\beta_a/2b_a$, $\beta_a/2b_a$	Line widths of the first and the second lasers and the ratio of the line width and correlation coefficient in phase diffusion model (if $\beta/2b \ll 1$, Gaussian spectrum, and if $\beta/2b \gg 1$, Lorentzian spectrum.)
for e.g. 8 168	Number of isotopes including hyperfine splitting and target isotope
for e.g. 66.7	Kinetic temperature for Doppler broadening (^0K)
for e.g. 168 0.135 0.0 0.0 2.7 0.42 0.67 1.0 $\vdots$	Isotope number, abundance(%), detuning(Ω_1, Ω_2 (f, GHz)), dipole moment (d_1, d_2 ($10^{-30}C \cdot m$)), cross section σ ($10^{-15}Cm^2$), ionization fraction

∗Each data type such as integer and float has been kept in mind in data file form.

The output file shows the selectivity of target isotope for a total power.

P_{tot}(W) S

(for e.g.)

10 0.2

The selectivity is defined by

$$S = \frac{\rho_{t44} \times ab_t \times fr_t}{\Sigma_i \rho_{i44} \times ab_i \times fr_i}, \tag{1}$$

where ρ_{s44}, ab_t fr_t represent the population of auto ionization level(A.I.), abundance, and ionization fraction of the abundance for target isotope, respectively. Σ_i means summation of the A.I. populations multiplied with abundance and fraction for all isotopes.