In the region where the level density is not high there are sharp resonances.

\[ \Delta \text{width} \to E \]

Example: \( p + ^{16}O \to \text{compound system} \to n + ^{18}S \)

13.3) Cross-section

\( \sigma \) is the cross section for the formation of a compound nucleus from incident channel 2.

\( \Gamma_p \) is probability of compound system \( N \) to decay through channel \( \beta \)

\[ \Gamma_p = \frac{\Gamma}{\beta} \text{ partial width} \]

A compound nucleus has many decay channels.

Total probability: \( \Gamma_a + \Gamma_b + \Gamma_c + \cdots \)

Total width \( \Gamma = \Gamma_a + \Gamma_b + \Gamma_c + \cdots \)

\( N \to a + \beta \)

\( N \to b + \beta \)

\( N \to c + c \)\( \gamma \)