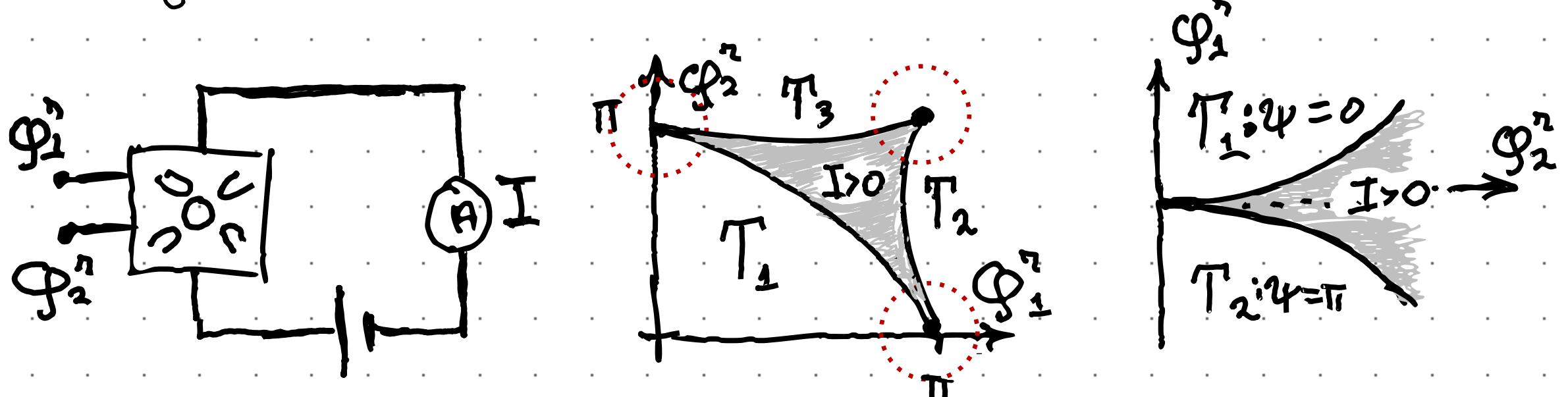


SOFT CONSTRAINED TOPOLOGICAL TRANSITION

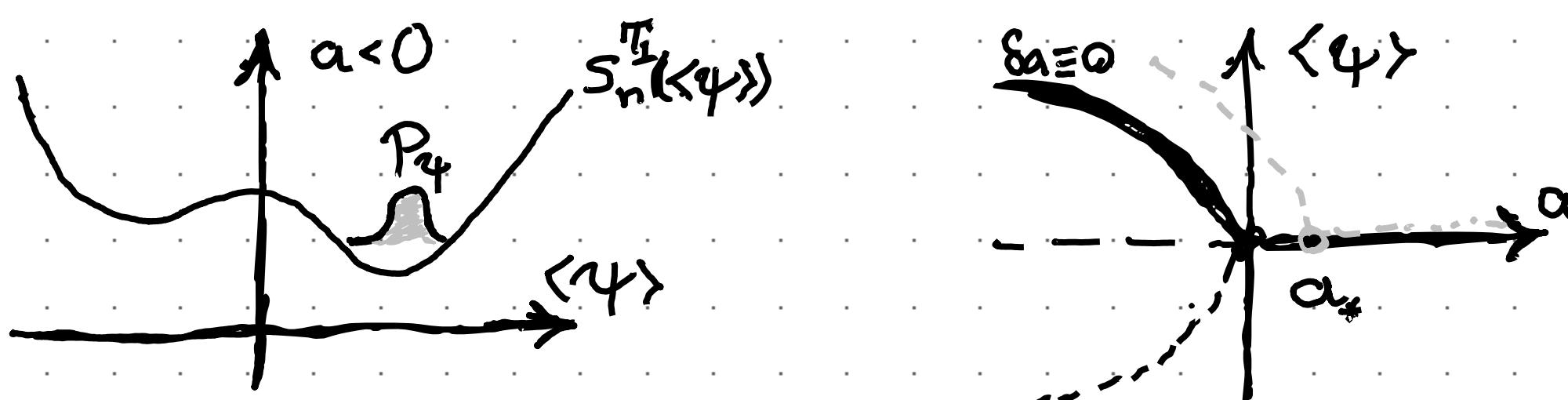
JĀNIS ERDMANIS, ÁRPÁD LUKÁCS, YULI V. NAZAROV

$$\mathcal{Z} = \left\{ \begin{array}{c} \text{Diagram of a multi-terminal superconducting nanostructure with a central node 'N' and three terminals 'S'. Each terminal has a magnetic flux } \Phi_1, \Phi_2, \Phi_3 \text{ and a resistance } R. \\ \text{The diagram shows various current paths and voltage drops across resistors.} \end{array} \right\} D\vec{\phi}(\tau)$$

$$S_n = \text{Diagram} = \frac{1}{2} \sum_{A,B} \sum_{\tau} T_\tau \left\{ \log \left[1 + \frac{T_\tau}{q} (G_A G_B + G_B G_A - 2) \right] \right\}$$



$$\Rightarrow S_n^{T_1} \approx T_\tau \left[-2\varepsilon\Psi + \frac{1}{2}(a+\delta a)\Psi^2 + \frac{1}{4}b\Psi^4 \right]$$



$$\langle S_n(a+\delta a, \Psi) \rangle \doteq S_n(a, \langle \Psi \rangle) + \langle S_n^{(2)} \rangle(a, \langle \Psi \rangle) \doteq S_n(a_*, \langle \Psi \rangle)$$

- Erdmanis, J., Lukcs, .., & Nazarov, Y. V. (2018). Weyl disks: Theoretical prediction. Physical Review B, 98(24).

- Huang, X. L. & Nazarov, Y. V. Topology protection-unprotection transition: an example from multi terminal superconducting nanostructures