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Ground State Degeneracy of Topological Phases on Open Surfaces YIDUN WAN, Perimeter Institute for Theoretical Physics, JANET HUNG, Department of Physics and Center for Field Theory and Particle Physics, Fudan University — we relate the ground state degeneracy (GSD) of a non-Abelian topological phase on a surface with boundaries to the anyon condensates that break the topological phase to a trivial phase. Specifically, we propose that gapped boundary conditions of the surface are in one-to-one correspondence to the sets of condensates, each being able to completely break the phase, and we substantiate this by examples. The GSD resulting from a particular boundary condition coincides with the number of confined topological sectors due to the corresponding condensation. These lead to a generalization of the Laughlin-Wu-Tao charge-pumping argument for Abelian fractional quantum Hall states to encompass non-Abelian topological phases, in the sense that an anyon loop of a confined anyon winding a non-trivial cycle can pump a condensate from one boundary to another. Such generalized pumping may find applications in quantum control of anyons, eventually realizing topological quantum computation.

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