Notes on Statistical Field Theory

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1 Thermodynamics & Statistical Mechanics

Closed system, Volume V, in thermodynamic equilibrium
Conserved quantities:

1. energy E

2. particle no. N

2 Quantum mechanics & Quantum Field Theory

completeness relation:

$$\int \prod_{\vec{x}} \mathrm{d}\phi_0(\vec{x})|\phi_0\rangle\langle\phi_0| = 1 \tag{1}$$

orthogonality:

$$\langle\phi_a|\phi_b\rangle = \prod_{\vec{x}} \delta(\phi_a(\vec{x}) - \phi_b(\vec{x})) \equiv \delta[\phi_a - \phi_b], \tag{2}$$

where the new delta notation is called the "functional δ-function".

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