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京都大学基礎物理学研究所　湯川記念館史料室

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A. S. Wightman and S. S. Schweber (1)
Configuration Space Methods in Relativistic Quantum Field Theory. I.
(P. R. 98 (1955), 812)

$[\psi^{(+)}(x), N^{(+)}] = \psi^{(+)}(x)$, $[\psi^{(+)\dagger}(x), N^{(+)}] = -\psi^{(+)\dagger}(x)$
$[\psi^{(+)}(x), N^{(-)}] = 0$, $[\psi^{(+)\dagger}(x), N^{(-)}] = 0$
Φ_λ : eigenfn of $N^{(+)}$ of eigenvalue λ
$\psi^{(+)}_\alpha(x)\Phi_\lambda$: " " $\lambda - 1$
$N^{(+)} = \int d^3x\, \psi^{(+)*}(x)\psi^{(+)}(x)$ (spin 1/2)

(Jean, Ann. phys. 8 (1953), 338)

$$a_j = \frac{1}{i}\int d\sigma^\mu(x)\left[\frac{\partial f_j}{\partial x^\mu}(x)\,\phi(x) - f_j(x)\frac{\partial \phi}{\partial x^\mu}(x)\right]$$