

(I) 場の description

field theory

$$\psi(x)$$

nonlocal

$$\psi = \psi^\dagger$$

indefinite
density

operator

(i)

x_μ complex $\psi = \psi^\dagger$

p_μ

complex $\psi = \psi^\dagger$
 reciprocal ψ^\dagger

analyticity

reciprocity
 wave-particle

(ii) strong unstable or particle

resonance level

共振状態の不安定な粒子

場の構造

(II) 場の構造

場の構造 (運動の kinematics)

(iii) 場の理論

kinematics

質量の起源

$$p_\mu = \frac{1}{\sqrt{2}}(a_\mu + a_\mu^\dagger)$$

二次場の理論

b, b^\dagger
 b, b

spin $\frac{1}{2}$
 spin $\frac{1}{2}$

discontinuity

H-quantum

(iv) mass formula \rightarrow mass of origin

self energy

field theory?

rotation
 oscillation

no field theory?

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	$j(j+1)$	$l(l+1)/2$
0	0	0
$1/2$	$3/4$	
1	2	1
$3/2$	$15/4$	
2	6	

