5.4 Quantenfeldtheorie

von Neumann $-\frac{\hbar}{i}\frac{\partial \varrho}{\partial t} = [H, \varrho]$

$E_{mw}(A) = M(A) = Sp\{\varrho A\}$

$-\frac{\hbar}{i}\frac{d}{dt} M(A) = Sp\{\varrho [H,A]\} = Sp\{\varrho HA\} - Sp\{\varrho AH\}$

$= Sp\{\varrho [A,H]\} = Sp\{\varrho AH\} - Sp\{\varrho HA\}$

$= Sp\{AH\varrho\} - Sp\{A\varrho H\} = Sp\{A[H,\varrho]\}$

$= -\frac{\hbar}{i} Sp\{A\frac{\partial \varrho}{\partial t}\}$

$\frac{d}{dt} M(A) = Sp\{\frac{\partial \varrho}{\partial t} A\}$ Schrödinger-Bild