

David Peter

Sommerfest der Mathematik und Physik

13. Juli 2012

dipolare quantengase in minimalen systemen

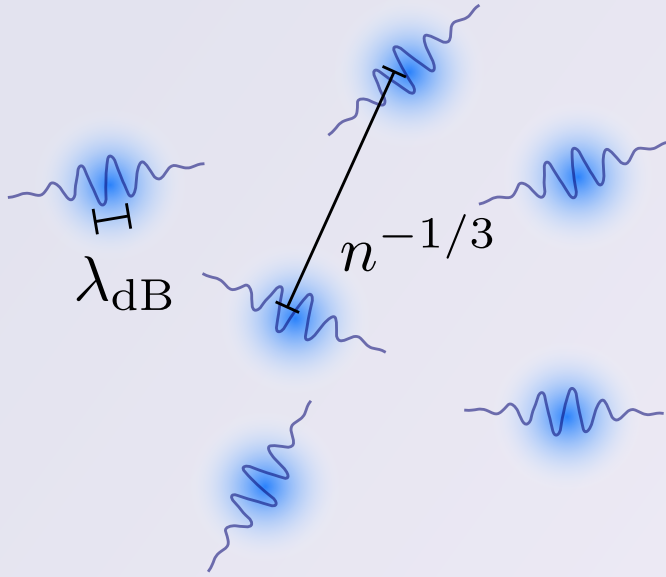


Satyendra Nath Bose

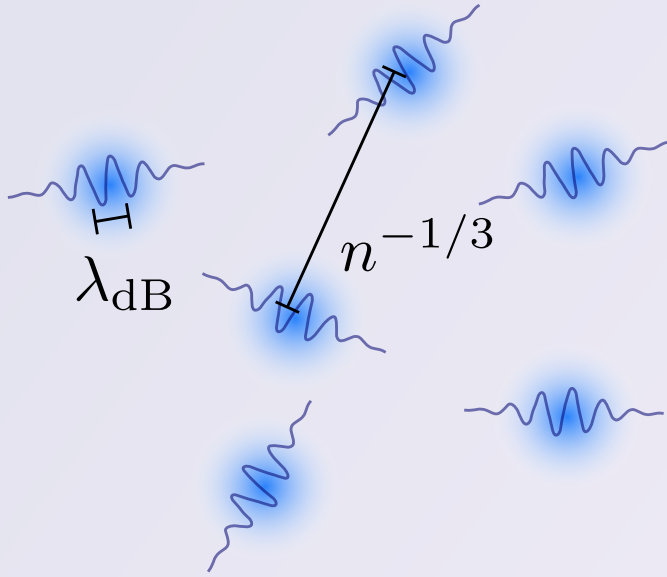
1894 - 1974



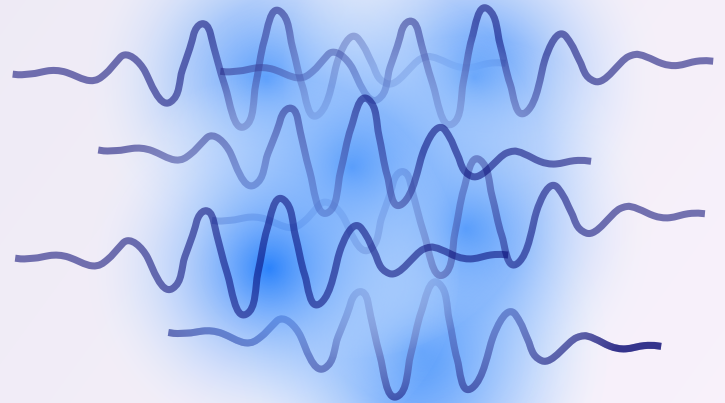
thermisches Gas



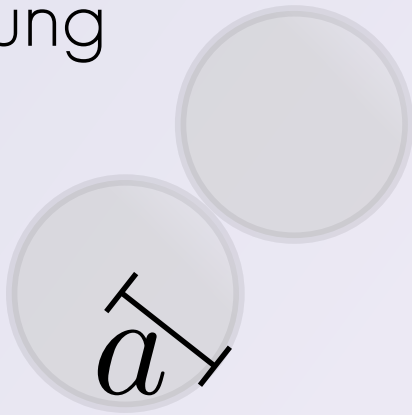
thermisches Gas



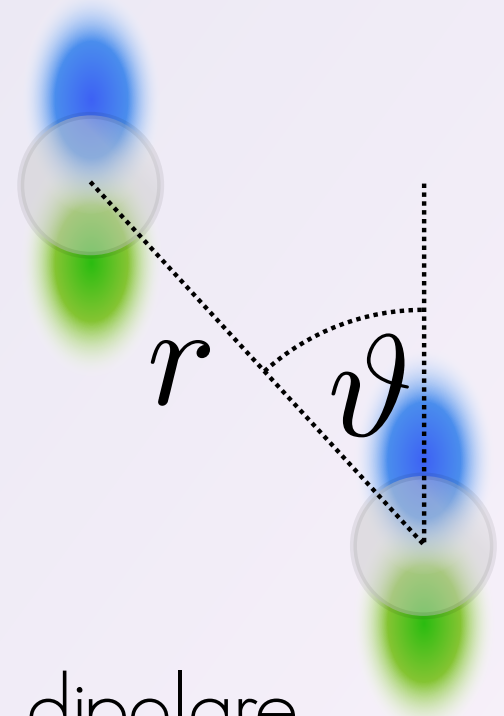
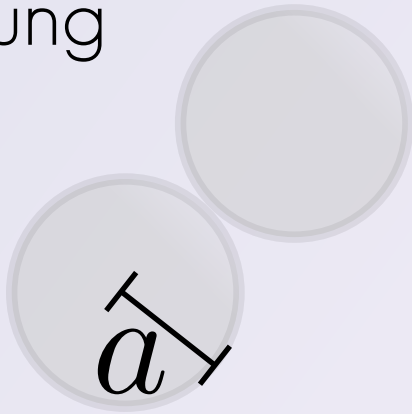
Bose-Einstein-
Kondensat



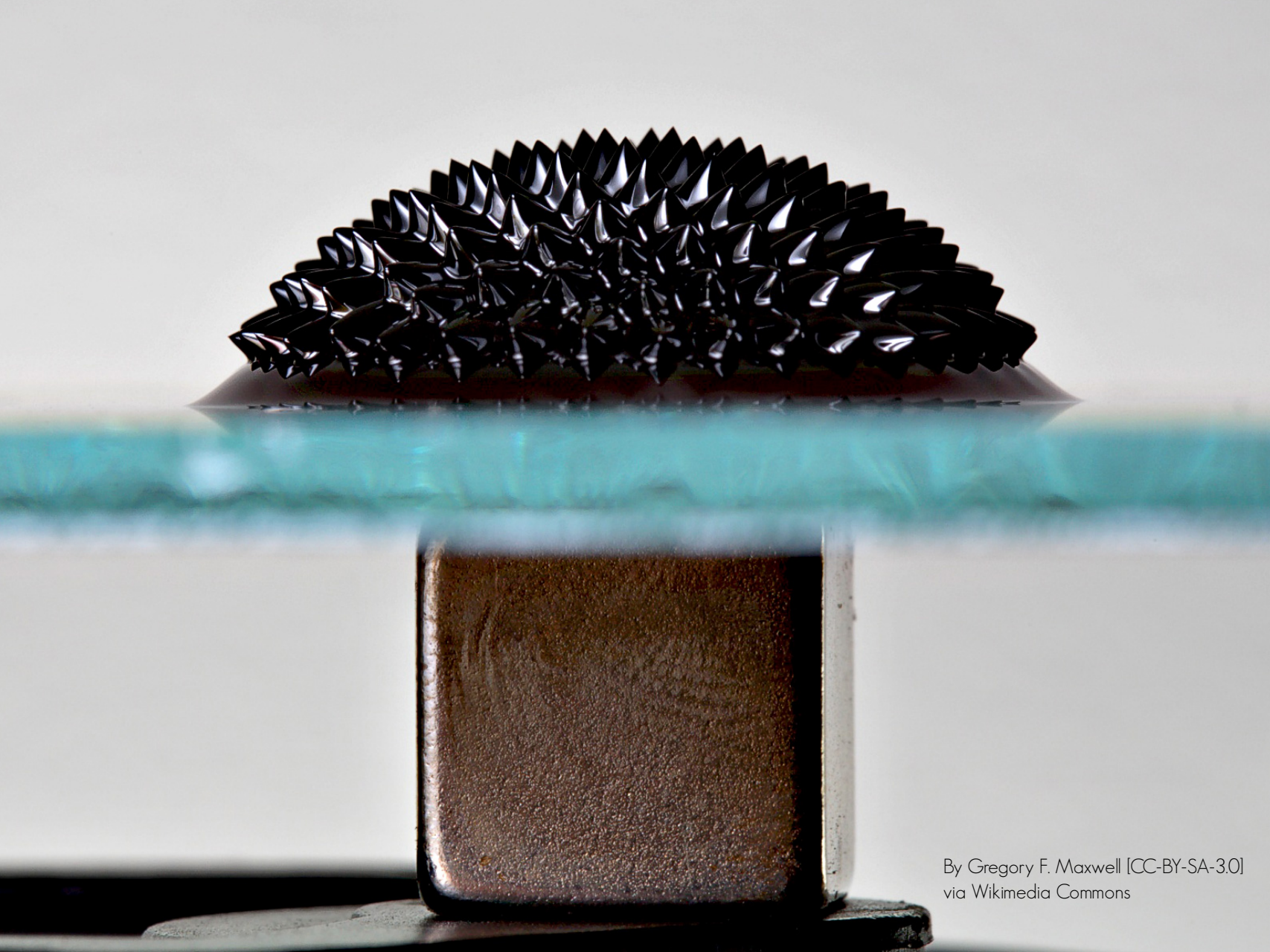
Kontakt-Wechsel- wirkung



Kontakt-Wechsel-
wirkung

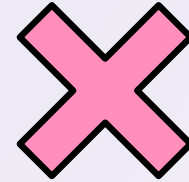
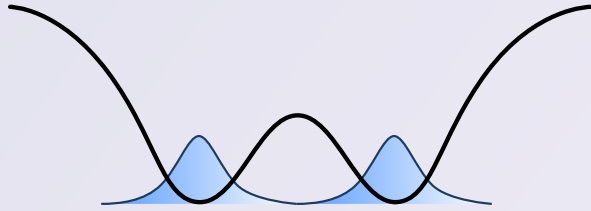


dipolare
Wechselwirkung

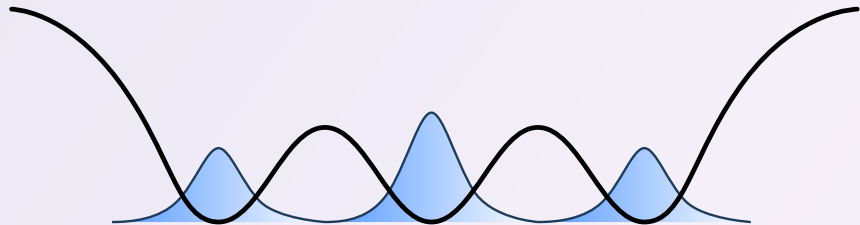
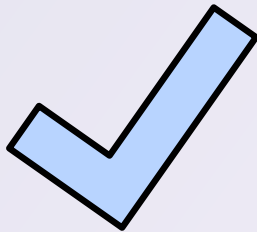


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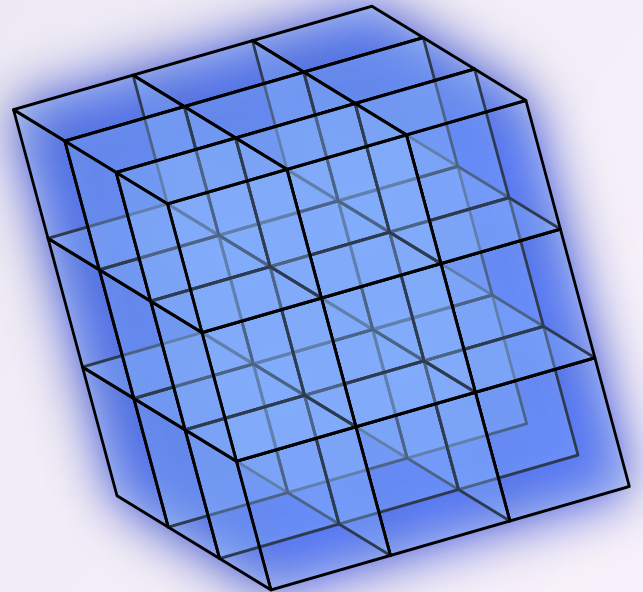
dipolare Effekte?



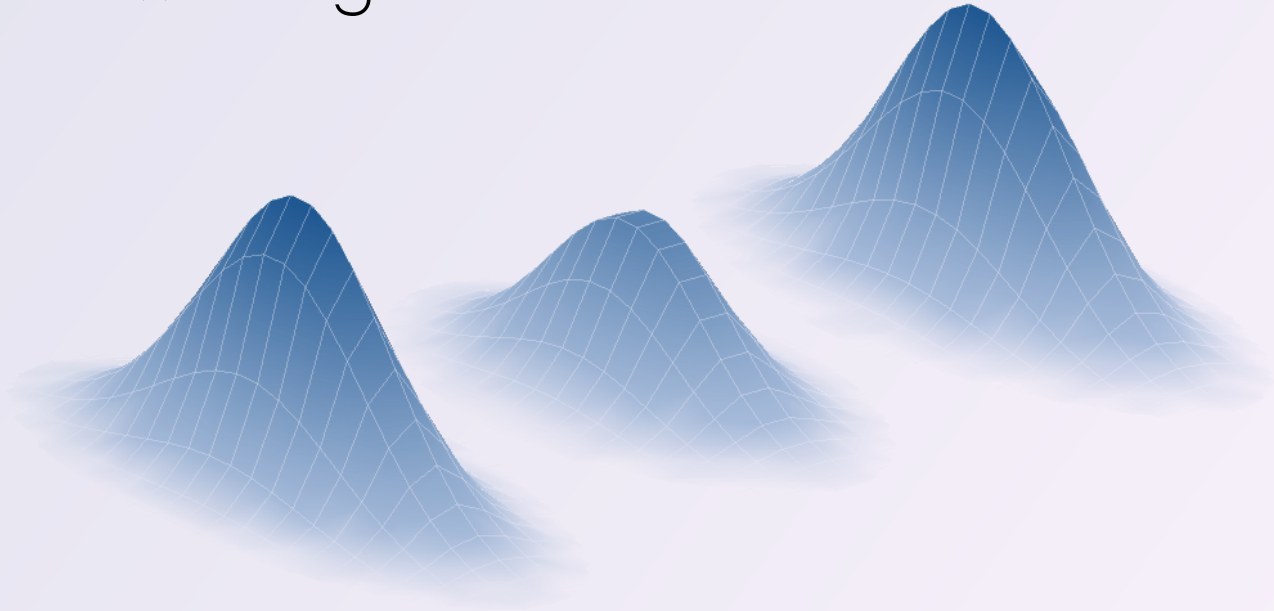
Gross-Pitaevskii Gleichung

$$i\hbar \frac{\partial}{\partial t} \Psi(\mathbf{r}, t) = \left[-\frac{\hbar^2}{2m} \nabla^2 + V(\mathbf{r}) + gN |\Psi(\mathbf{r}, t)|^2 + \frac{3}{4\pi} g_{\text{dd}} N \int d^3 r' \frac{1 - 3 \cos^2(\vartheta)}{|\mathbf{r} - \mathbf{r}'|^3} |\Psi(\mathbf{r}', t)|^2 \right] \Psi(\mathbf{r}, t)$$

numerische Lösung
auf 3D Gitter



Demonstration langreichweitiger Wechselwirkung





goo.gl/9eyWt

Vielen Dank!