# From $A_2$ chamber to 3 bosons in a lab frame

Maxim
BOS
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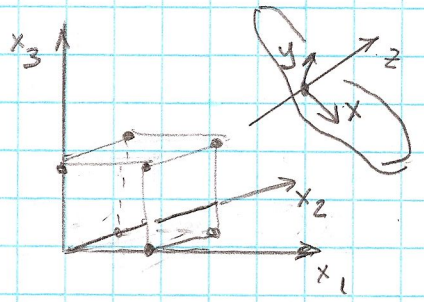
$A_2$
$N = 3$

$$\hat{h} = -\frac{\hbar^2}{2m}\left(\frac{\partial^2}{\partial x^2} + \frac{\partial^2}{\partial y^2}\right) + \tilde{g}\sum_{j=1}^{N}\delta(\vec{n}_j\cdot\vec{r})$$

$$\vec{n}_j = \begin{pmatrix} \cos(2\pi(j-1)/N) \\ \sin(2\pi(j-1)/N) \end{pmatrix}$$

$$j = 1, 2, \ldots, N$$




$$\begin{pmatrix} x \\ y \\ z \end{pmatrix} = \hat{M}\begin{pmatrix} x_1 \\ x_2 \\ x_3 \end{pmatrix} \qquad \hat{M}\hat{M}^T = \hat{I} \qquad \hat{M} = \begin{pmatrix} \frac{1}{\sqrt{2}} & -\frac{1}{\sqrt{2}} & 0 \\ \frac{1}{\sqrt{6}} & \frac{1}{\sqrt{6}} & -\sqrt{\frac{2}{3}} \\ \frac{1}{\sqrt{3}} & \frac{1}{\sqrt{3}} & \frac{1}{\sqrt{3}} \end{pmatrix}$$

$$\hat{H} = -\frac{\hbar^2}{2m}\left(\frac{\partial^2}{\partial x_1^2} + \frac{\partial^2}{\partial x_2^2} + \frac{\partial^2}{\partial x_3^2}\right) + g\underbrace{\sum_{i=1}^{N_{at}}\sum_{j=i+1}^{N_{at}}\delta(x_i - x_j)}_{3 \text{ terms}}$$

$\delta^3$

$$\tilde{g} = \frac{1}{\sqrt{2}}g$$