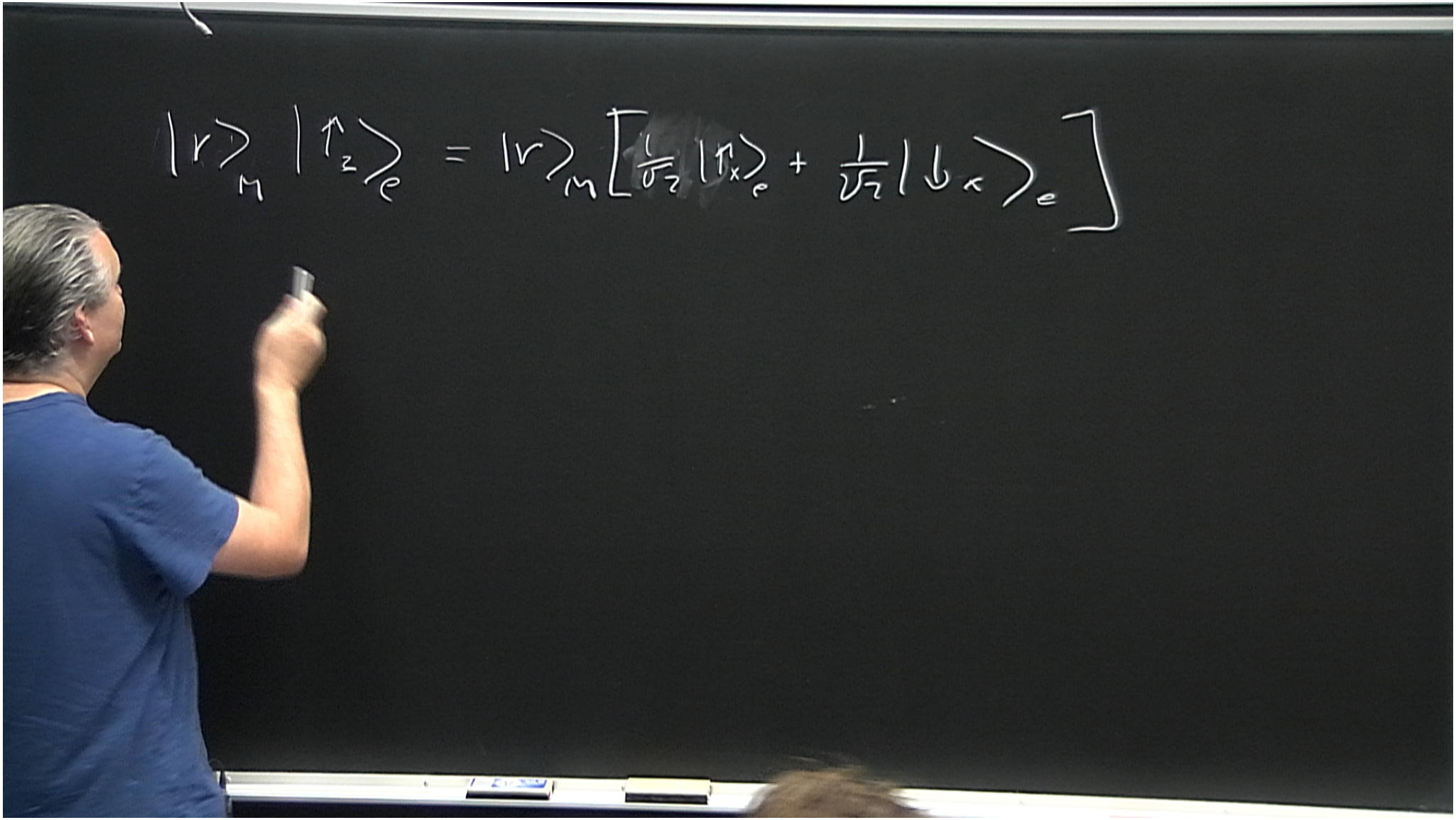
Title: The Quantum-Mechanical Measurement Problem and the Foundations of Statistical Mechanics

Date: May 28, 2013 10:00 AM

URL: http://pirsa.org/13050062

Abstract:

$$|r\rangle_M |\uparrow_z\rangle_e = |r\rangle_M \left[|r_x\rangle \right.$$


$|r\rangle_M |\uparrow_z\rangle_e = |r\rangle_M \left[\frac{1}{\sqrt{2}}|\uparrow_x\rangle_e + \frac{1}{\sqrt{2}}|\downarrow_x\rangle_e\right]$

$$|r\rangle_M |\uparrow_z\rangle_e = |r\rangle_M \left[\frac{1}{\sqrt{2}}|\uparrow_x\rangle_e + \frac{1}{\sqrt{2}}|\downarrow_x\rangle_e\right]$$

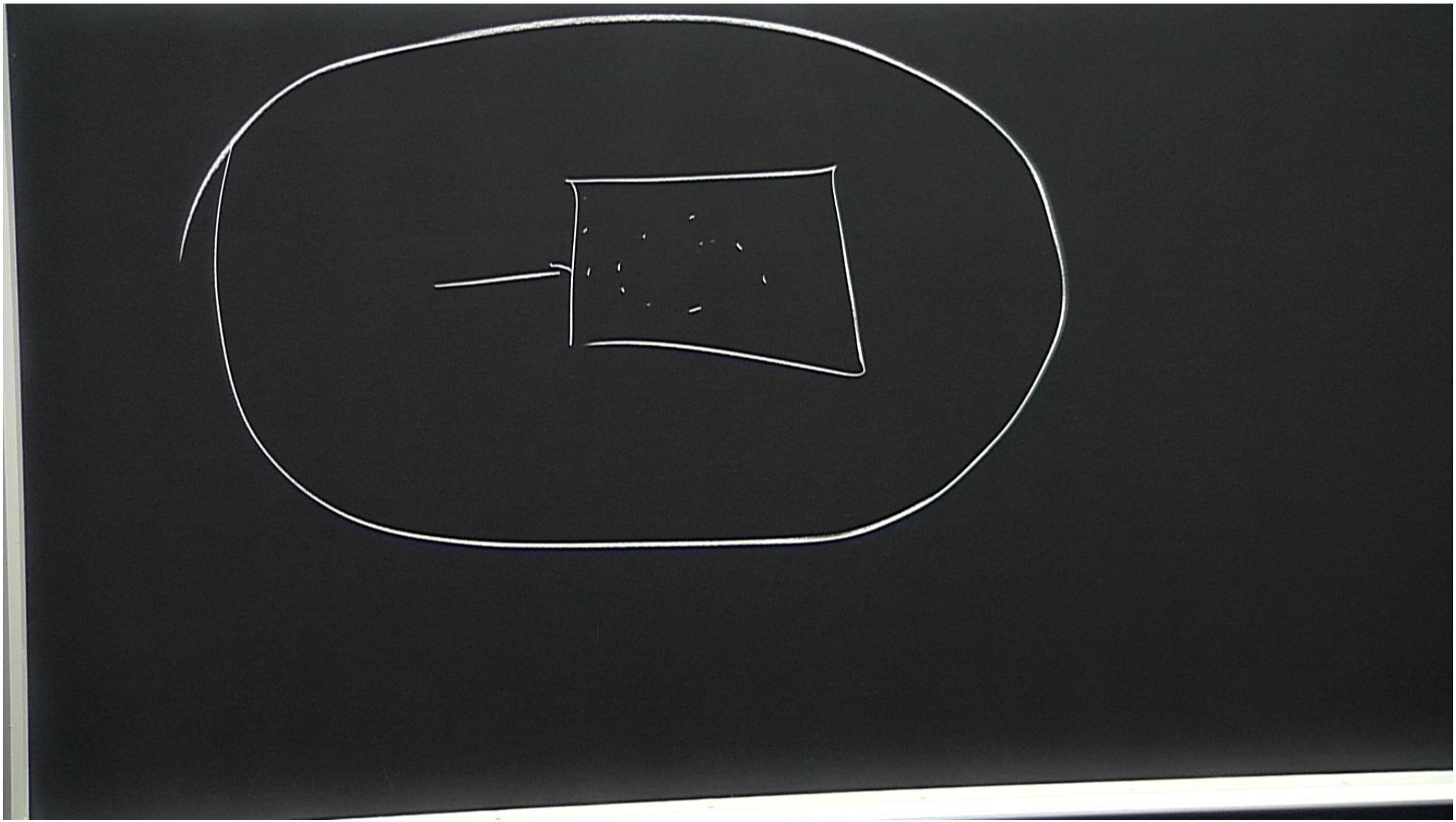
$$\rightarrow \frac{1}{\sqrt{2}}|\text{it up}\rangle_M |\uparrow_x\rangle_e + \frac{1}{\sqrt{2}}|\text{it d}\rangle_M |\downarrow_x\rangle_e$$

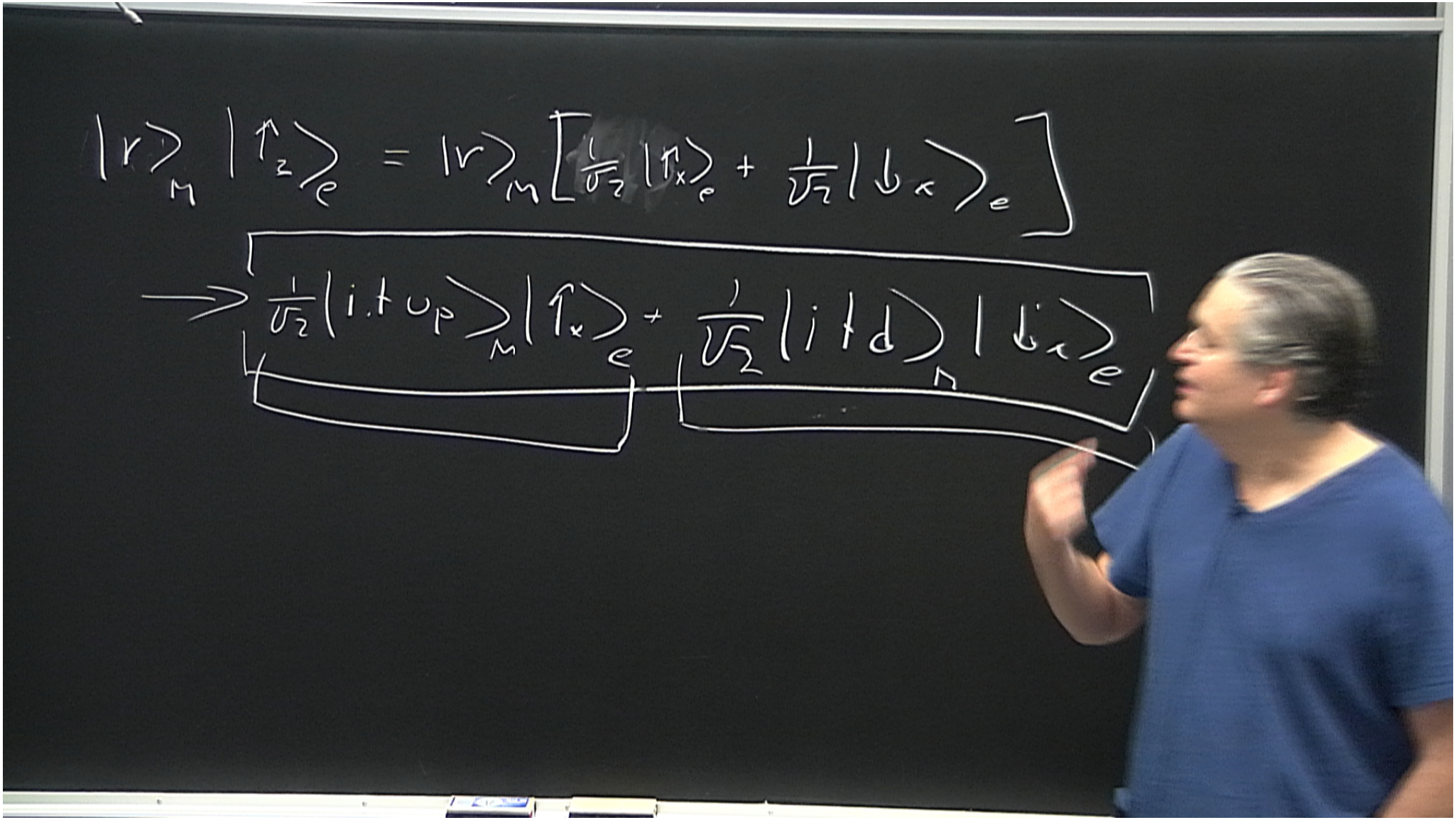
$$|r\rangle_M |\uparrow_z\rangle_e = |r\rangle_M \left[\frac{1}{\sqrt{2}}|\uparrow_x\rangle_e + \frac{1}{\sqrt{2}}|\downarrow_x\rangle_e\right]$$

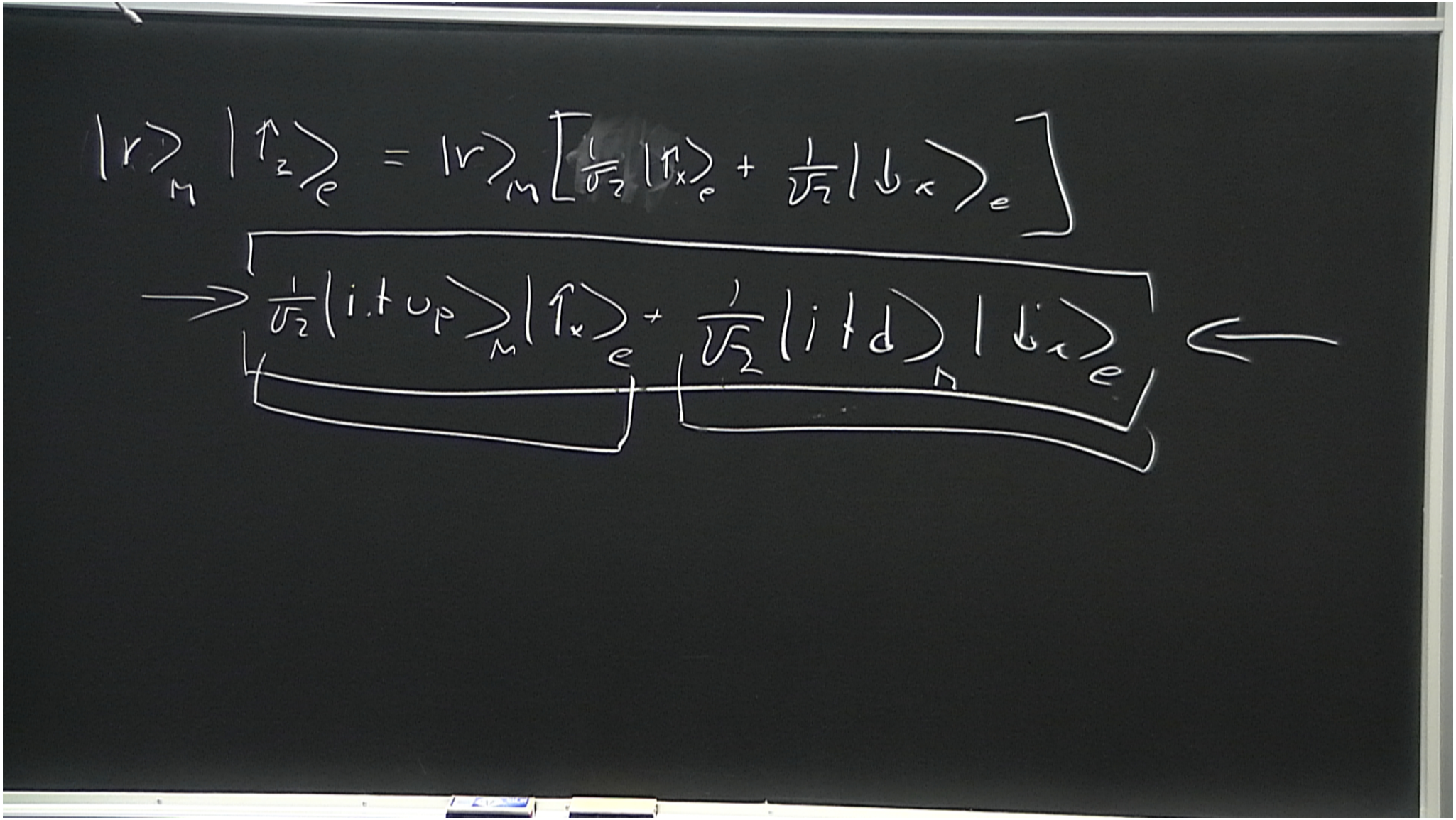
$$\rightarrow \underline{\frac{1}{\sqrt{2}}|i.t\,up\rangle_M |\uparrow_x\rangle_e + \frac{1}{\sqrt{2}}|i.t\,d\rangle_n |\downarrow_x\rangle_e}$$

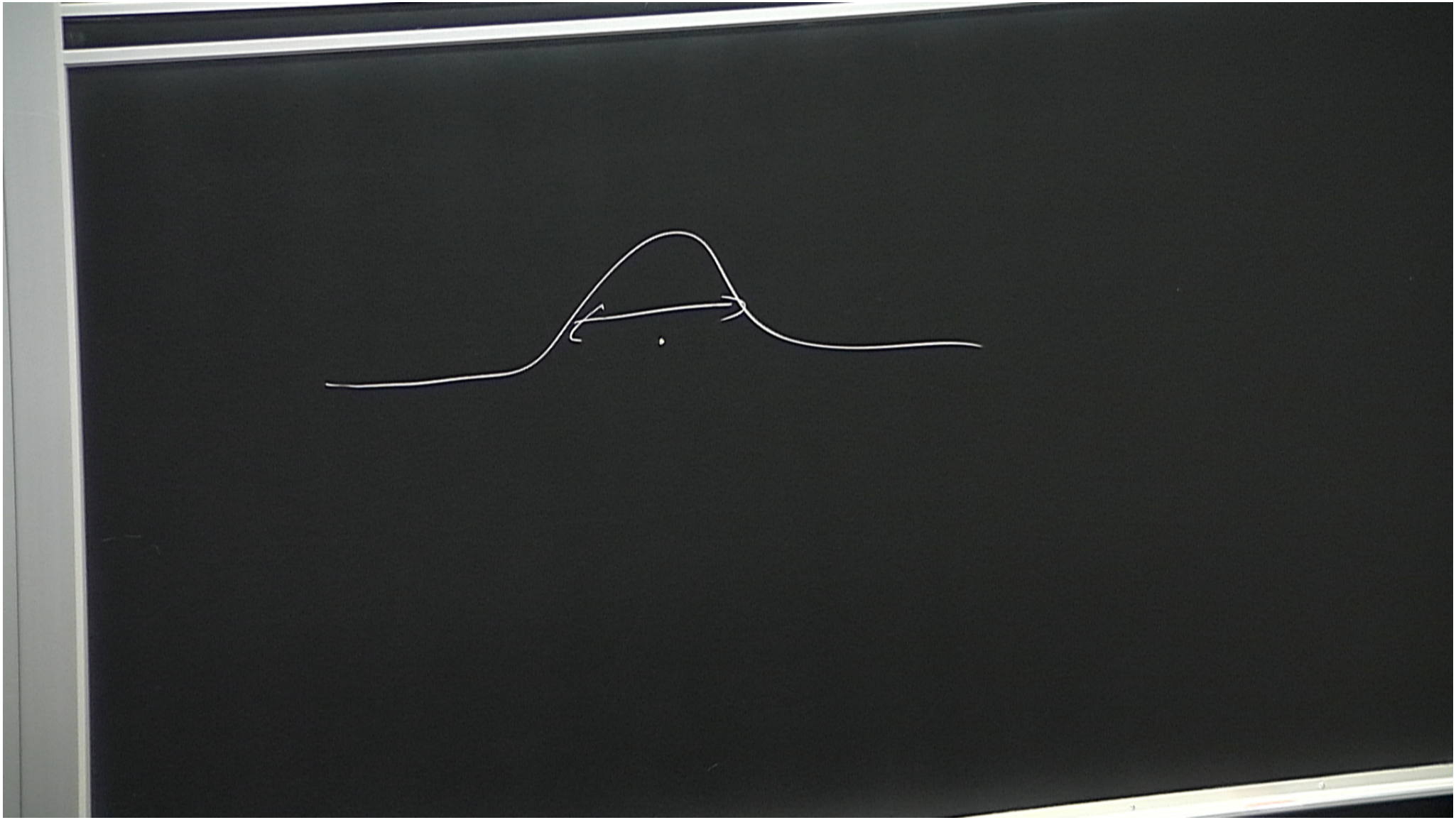
$$|r\rangle_M |\uparrow_z\rangle_e = |r\rangle_M \left[\frac{1}{\sqrt{2}}|\uparrow_x\rangle_e + \frac{1}{\sqrt{2}}|\downarrow_x\rangle_e\right]$$

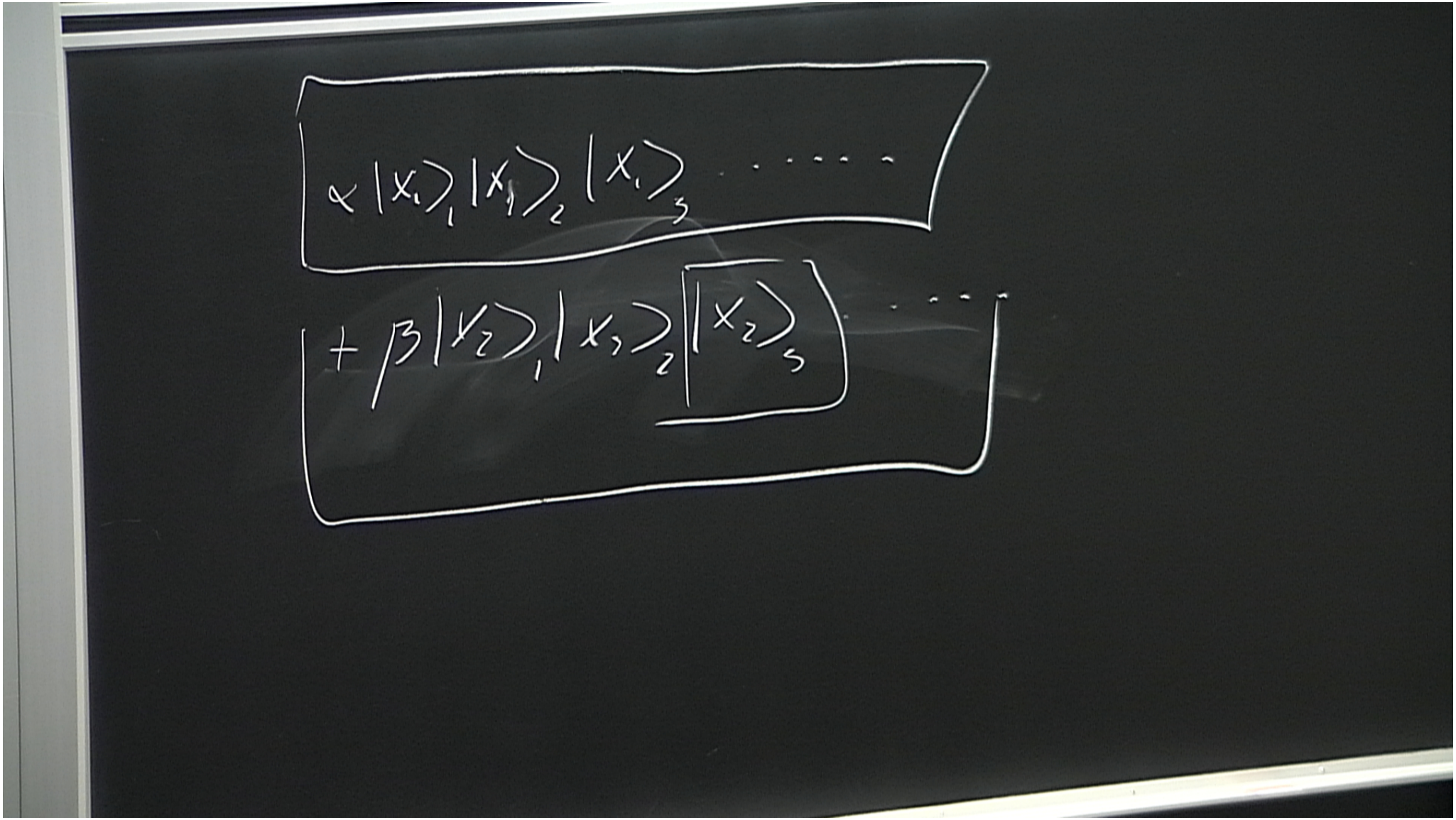
$$\rightarrow \boxed{\frac{1}{\sqrt{2}}|i.t\,up\rangle_M |\uparrow_x\rangle_e + \frac{1}{\sqrt{2}}|i.t\,d\rangle_n |\downarrow_x\rangle_e}$$

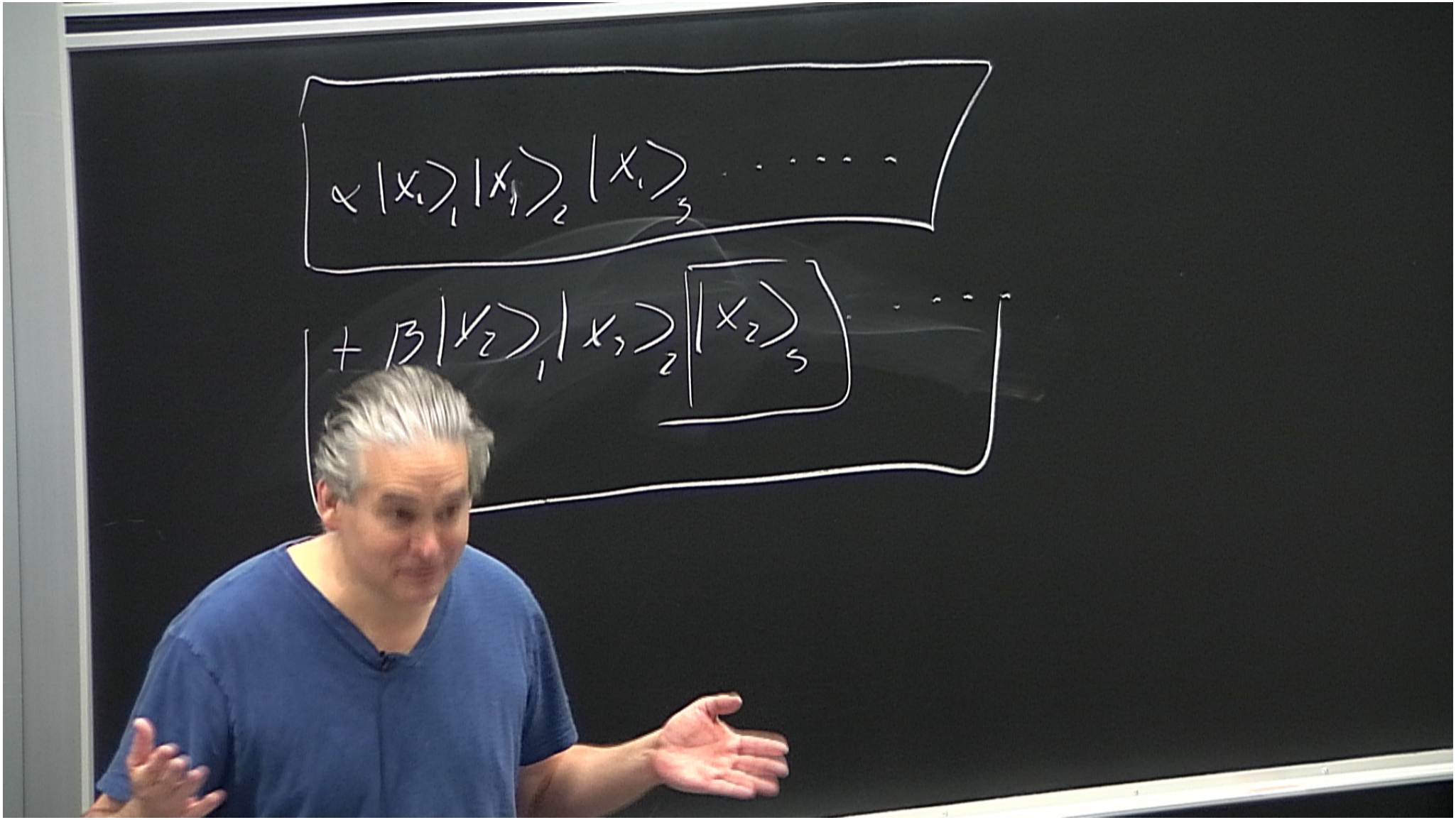



$|r\rangle_M |\uparrow_z\rangle_e = |r\rangle_M \left[\frac{1}{\sqrt{2}}|\uparrow_x\rangle_e + \frac{1}{\sqrt{2}}|\downarrow_x\rangle_e\right]$
$\rightarrow \frac{1}{\sqrt{2}}|i.t\,up\rangle_M|\uparrow_x\rangle_e + \frac{1}{\sqrt{2}}|i.t\,d\rangle_M|\downarrow_x\rangle_e$


$|r\rangle_M |\uparrow_z\rangle_e = |r\rangle_M \left[\frac{1}{\sqrt{2}}|\uparrow_x\rangle_e + \frac{1}{\sqrt{2}}|\downarrow_x\rangle_e\right]$
$\rightarrow \frac{1}{\sqrt{2}}|i.t\,up\rangle_M|\uparrow_x\rangle_e + \frac{1}{\sqrt{2}}|i.t\,d\rangle_M|\downarrow_x\rangle_e \leftarrow$




$\alpha |x_1\rangle_1 |x_1\rangle_2 |x_1\rangle_3 \cdots$
$+ \beta |x_2\rangle_1 |x_3\rangle_2 |x_2\rangle_3 \cdots$


$\alpha |x_1\rangle_1 |x_1\rangle_2 |x_1\rangle_3 \cdots$
$+ \beta |x_2\rangle_1 |x_3\rangle_2 |x_2\rangle_3 \cdots$