M. Entraplement

1. Introduction

Consider a bipartike state 14> E KA & KJ.

We say that 147 15 a product state of A can be written as

for some (\$A) & I(A) & I(A) & EX.

If hys is not a product state, we say that 14) is catangled.

Hos can we tell of a state is a product state or entangled?

Consider Schwidt decomposition of 142:

14> = [1/pit > =/pit>

with a her heavilt rack,

• 
$$\gamma = 1 = 0$$
  $|\psi\rangle = |\psi|^{A} = |\psi|^{A} = 0$   $|\psi\rangle = 0$   $|\psi\rangle = 0$   
•  $|\psi\rangle = 0$   $|\psi\rangle = (\psi)^{A} = 0$   $|\psi\rangle = 0$ 

by particular, states much as  

$$|\psi\rangle = \frac{1}{12} (10)(10 - 10)(10)$$
  
or  $|D\rangle = \frac{1}{12} \frac{d}{d} |z|$ 

are entangled.

Product states: Can describe any acha of A&B independently, and state  $|\psi\rangle = |\phi^{A}\rangle = |\phi^{Q}\rangle \longmapsto (\Pi_{A} = N_{B})/\psi\rangle$ = 17, 14, > = NB 14">

stays a product state.

Entanfed Stakes !

leaverally cannot describe actions of AUS malepandently - e.g., meas, outcomes n Schuidt bars will be projectly correlated.

Can we use these correlations for non-minal tasker?

Questions on certauplement theory; · Kas un-classical are entangled stakes? · What can we do with entangled staks? (I.e., are they a resource?) · How can we quantify the amount of entanplement (e.g. n koms of useplacen)? · Are there different types of entrugled stakes! · How can we manipulate cutangled stakes?

· What about unixed stake enten flement?