

M2/M5-Brane states in their matrix model.
 From the 11d perspective, these $D_6 \perp D_8$ configurations are – as anything classified by 4-Cohomotopy in 11d – certain M₂/M₅-brane states, as also suggested by the expected string theory dualities (cf. [BLMP13, p. 37]).

Traditionally, the *BMN matrix model* — which is meant to be the lightcone quantization of Membranes on (Penrose limits of) singular M₂/M₅-brane backgrounds — suggests [MSJVR03][AIST17][AIST18] that the supersymmetric quantum ground states of transverse M₂/M₅-brane bound states are fuzzy 2-spheres, namely $\mathfrak{su}(2)$ -modules.

With quantum Hypothesis H we find these $\mathfrak{su}(2)$ -modules as quantum states of branes such that these limits make sense: Namely as weight systems on chord diagrams [SS22-Cnf, §4.9]

susy ground state of M₂/M₅
 according to BMN matrix model

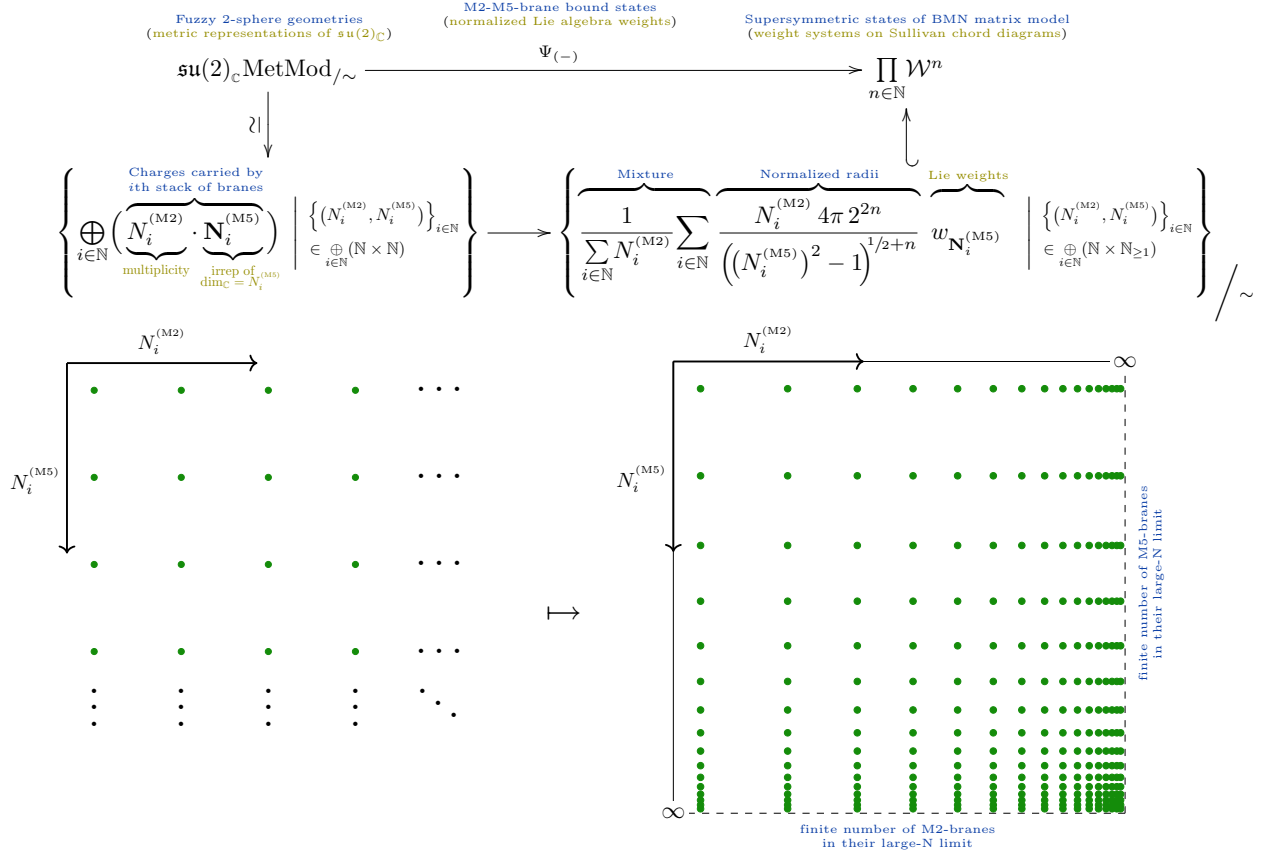
$$\left(\bigoplus_i N_i^{(M2)} \cdot N_i^{(M5)} \right) \in \mathfrak{su}(2)_C \text{Mod}/\sim$$

$$N := \sum_i N_i^{(M2)} N_i^{(M5)} \in \mathbb{N}$$

	M2-branes	M5-branes
If for all i :	$N_i^{(M5)} \rightarrow \infty$	$N_i^{(M2)} \rightarrow \infty$
with fixed	$N_i^{(M2)}$	$N_i^{(M5)}$
and fixed	$N_i^{(M5)}/N$	$N_i^{(M2)}/N$

$$\frac{4\pi 4^n}{\left((N^{(M5)})^2 - 1 \right)^{1/2+n}} w_{\mathbf{N}^{(M5)}} \left(\text{Single-trace observable (round chord diagram)} \right) = \frac{4\pi}{\sqrt{(N^{(M5)})^2 - 1}} \text{Tr}_{\mathbf{N}^{(M5)}} (X_a \cdot X^a \cdot X_b \cdot X_c \cdot X^b \cdot X^c)$$

$$= \int_{S^2_{N^{(M5)}}} (R^2)^3 \text{ (fuzzy 2-sphere shape coefficient)}$$



(123)