# Exclusive threshold J/ψ photoproduction with GlueX: status and anticipated results (GlueX Collaboration)

"First measurements of near-threshold J/ψ exclusive photoproduction off the proton" PRL 123, 072001 (Aug 2019)

# **GlueX** detector

## Exclusive reaction $\gamma p \rightarrow J/\psi p \rightarrow e^+e^-p$



• GlueX has full acceptance for this reaction

### **GlueX** statistics



Published results

#### • Preliminary results from GlueX PHASE-I data

### GlueX total cross-sections: anticipated errors



**Published results** 



Preliminary results (STAT.+SYST. ERRORS ONLY • SHOWN!) from GlueX PHASE-I data

### $J/\psi$ differential cross-section (t-dependence)



gluonic form factor (dipole form in analogy with the e.m. FF):

$$F(t) \sim 1/(1 - t/m_{2g}^2)^2$$

Frankfurt and Strikman PRD66 (2002)

Proton Gluonic Form Factors: A,B,D (lattice calculations)



# $J/\psi$ 2D differential cross-sections with GlueX

ERRORS ONLY shown for 2D differential cross-sections



 Preliminary results: STAT. ERRORS ONLY SHOWN on top of total crosssection parametrization (using published results) with dipole t-dependance, from GlueX PHASE-I data

# **Final remarks**

- Four-fold increase in the statistics from GlueX PHASE-I data, compared to the published results
- Analysis of the total cross sections from GlueX PHASE-I is very advanced; expect publication in the near future
- GlueX PHASE-II data taking is underway: expect at least twice more statistics compared to PHASE-I
- Most likely we would need the total statistics of PHASE I and II to publish the 2D differential cross sections