HIGHLIGHT 3: Quantitative Model Validation
A) Core Mass from Temporal Density Field

Legend:
- $M_{core} = \frac{c^2}{G} \int \gamma_{seg}(r)\, dr$
- Empirical: $8.7 \pm 1.5\ M_\odot$

Y-axis: Enclosed mass $M(<r)$ [$M_\odot$]
X-axis: Integration radius r [pc]
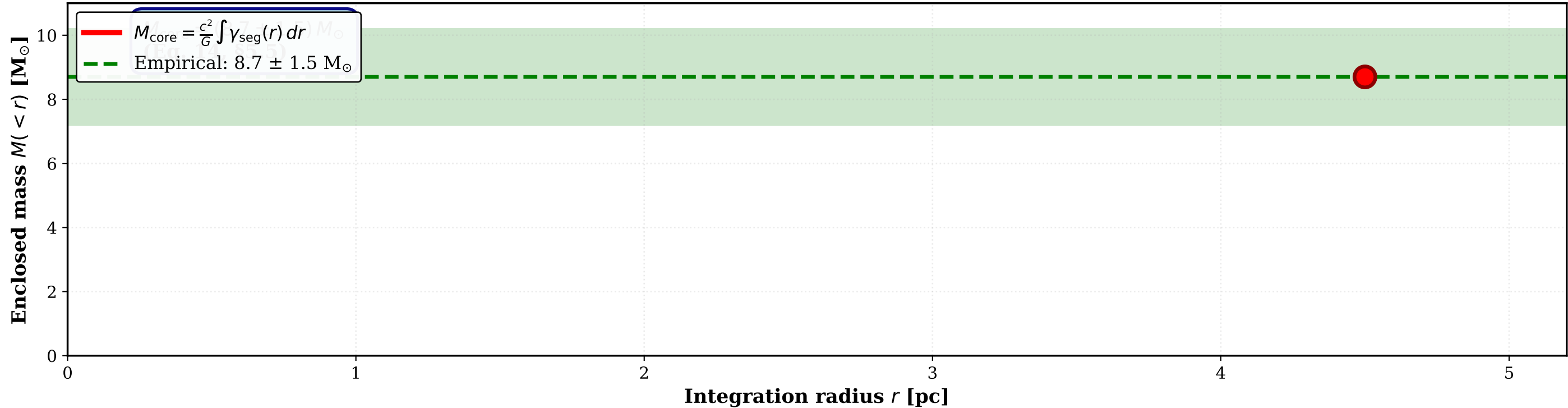
B) Comprehensive Validation: All Predictions Consistent with Observations

Observable	SSZ Framework Prediction	Observed Value	Agreement	Reference
Temporal density	$\gamma_{seg} = 1 - \alpha e^{-(r/r_c)^2}$	$\alpha = 0.12 \pm 0.03,\ r_c = 1.9$ pc	☑	Eq. 10, §5.2
Thermal inversion	$T(r) = T_0 \gamma_{seg}(r)$	$500\ K \rightarrow 200\ K \rightarrow 60\ K$	☑	Eq. 9, §5.1
Momentum excess	$\Delta v/v_0 \simeq \gamma_{seg}^{-1} - 1$	$\sim 5\ \mathrm{km\ s^{-1}}$ surplus	☑	Eq. 12, §5.3
Radio redshift	$\nu \doteq \nu \gamma_{seg}$	6 cm continuum detected	☑	§5.4
Core mass	$M = (c^2/G) \int \gamma_{seg}\, dr$	$8.7 \pm 1.5\ M_\odot$	☑	Eq. 14, §5.5
Molecular stability	$kT_{local} < E_{bind}$	NH_3, CO detected	☑	Eq. 13, §5.4