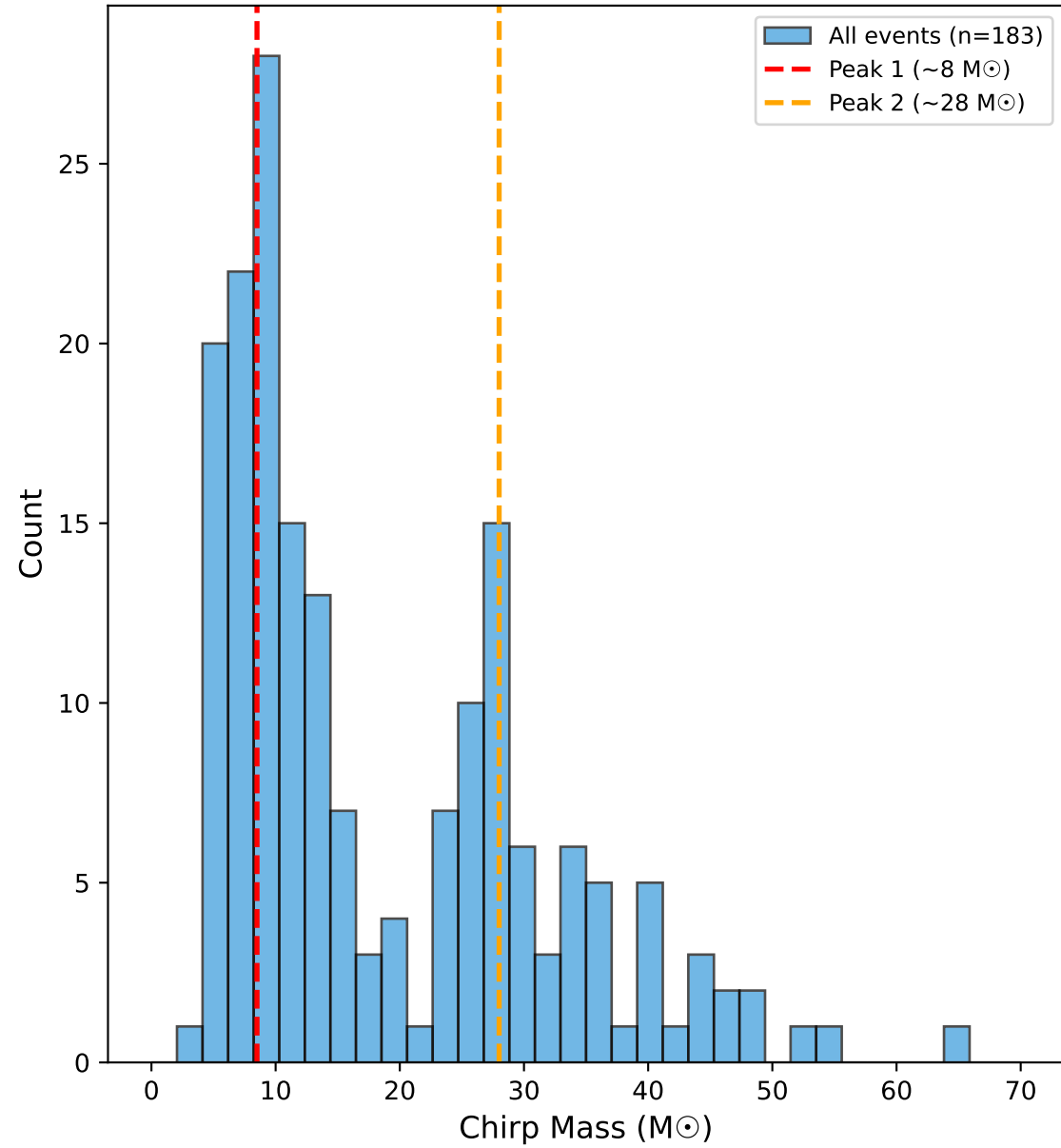
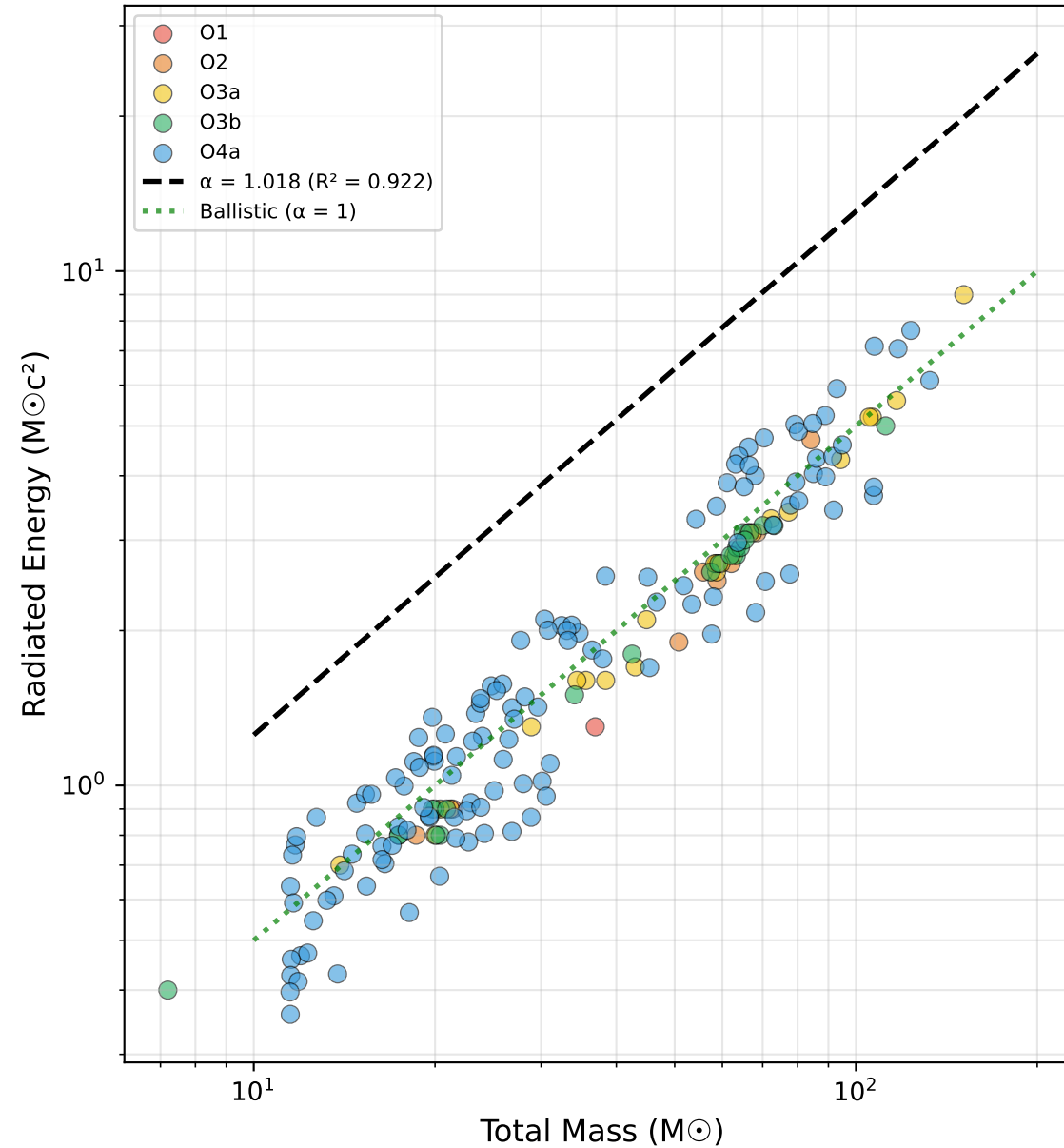


RTM Gravitational Waves: O4 Extended Validation (GWTC-4.0)

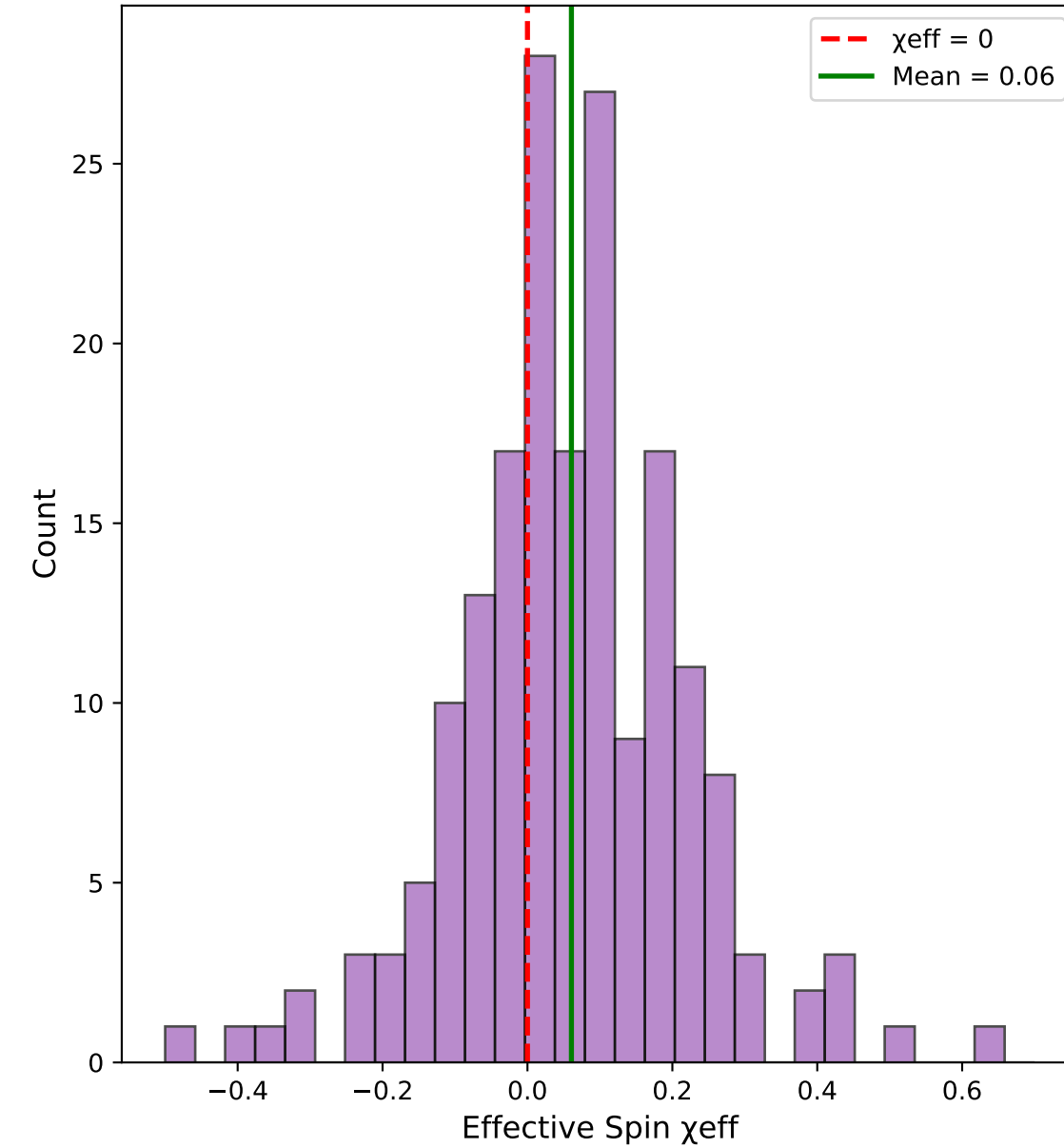
1. Chirp Mass Distribution (GWTC-4.0: Bimodal)



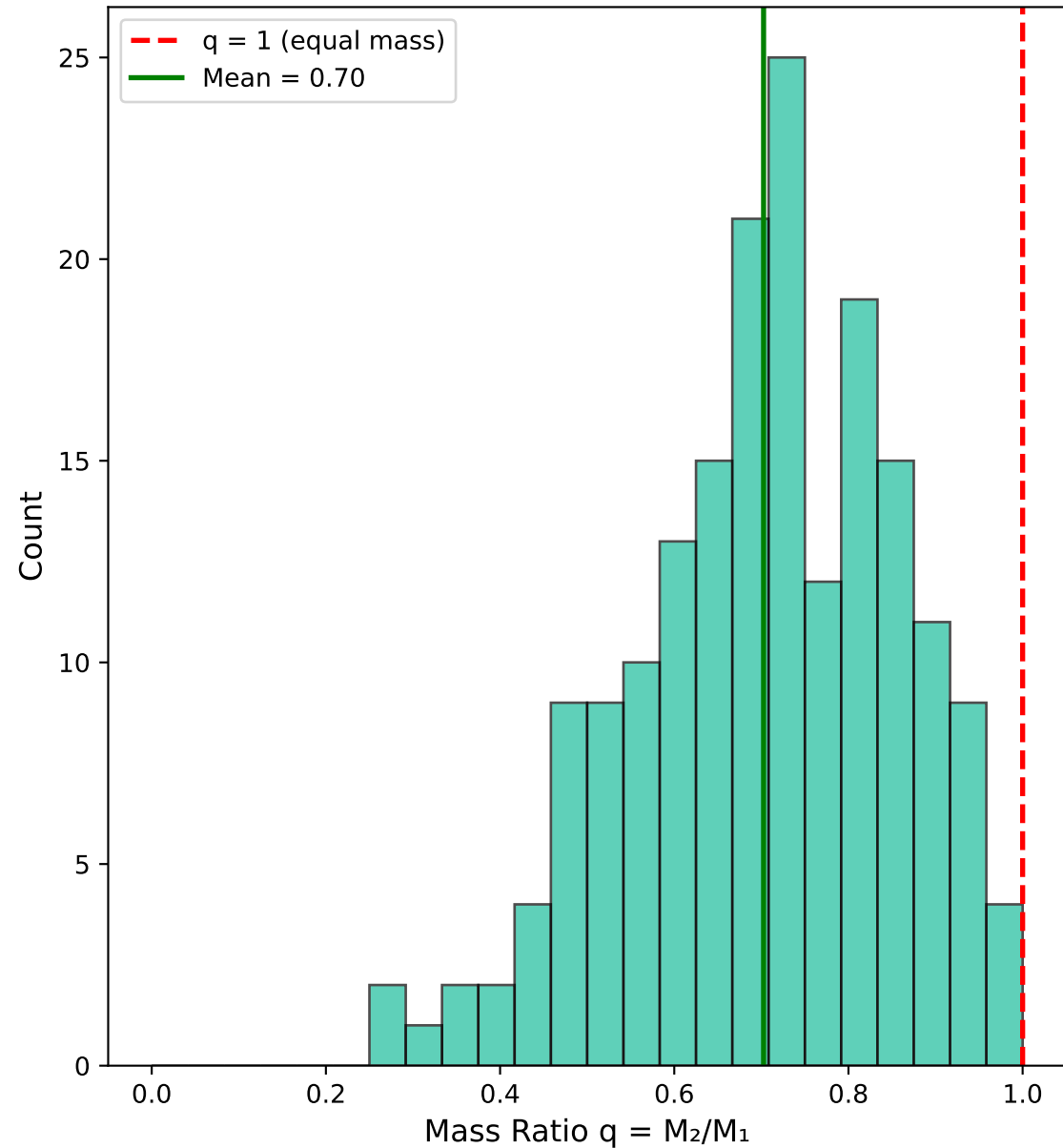
2. RTM Scaling: E_{rad} vs M_{total}



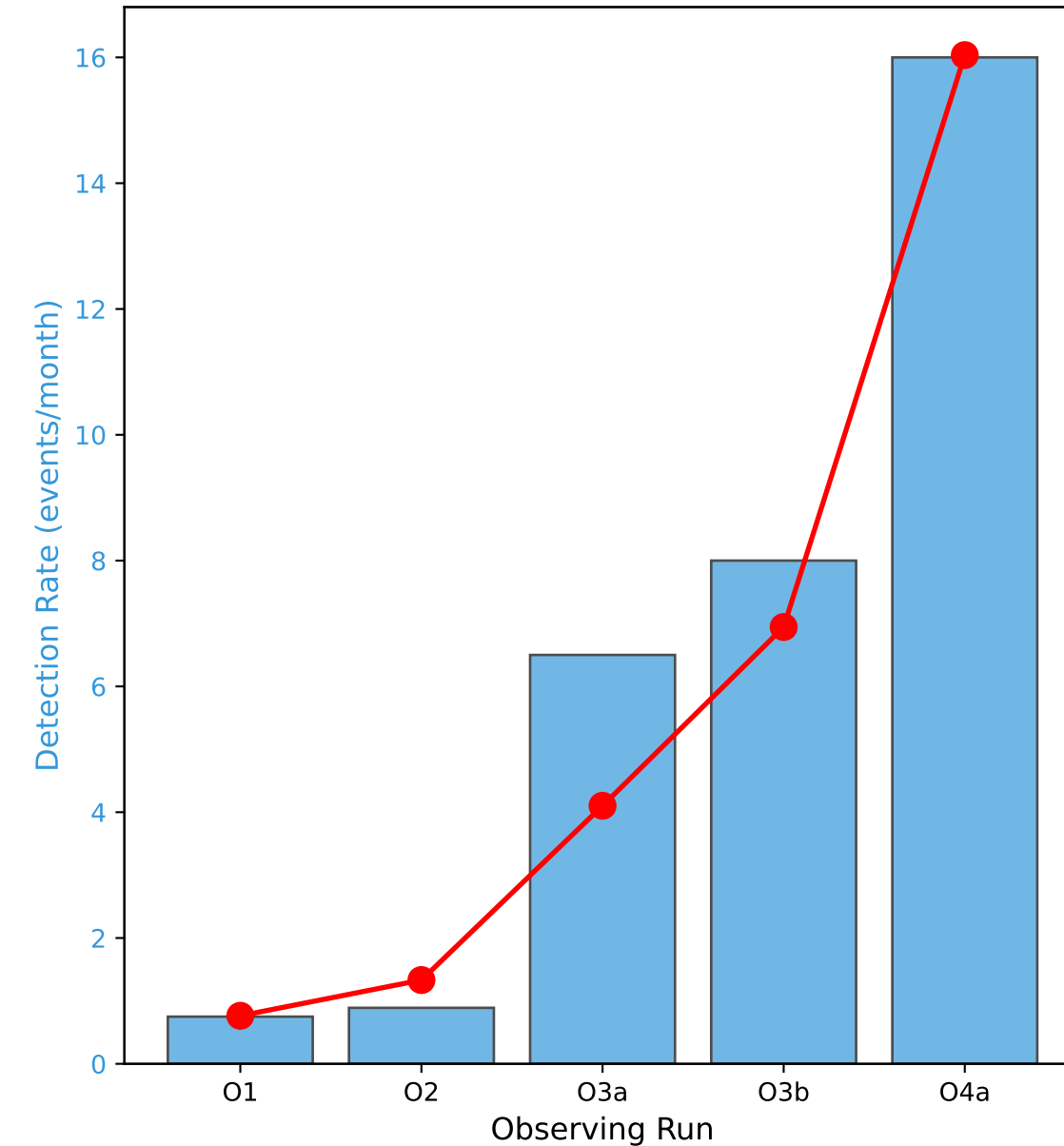
3. Effective Spin Distribution (Peaked near 0)



4. Mass Ratio Distribution



5. Detection Rate Evolution



RTM GRAVITATIONAL WAVE VALIDATION

OBSERVING RUNS (2015-2025):
01-03: 90 confident events
04a: 128 confident events (GWTC-4.0)
04b/c: 173 candidates (prelim)
TOTAL: 218+ confident, ~391 candidates

RTM SCALING ANALYSIS:
Raw: $\alpha = 1.018 \pm 0.022$
Spin-corrected: $\alpha = 1.020$
 $R^2 = 0.922$

RTM Prediction: $\alpha \rightarrow 1$ (BALLISTIC)

CHIRP MASS DISTRIBUTION:
Bimodal peaks at $\sim 8 M_{\odot}$ and $\sim 28 M_{\odot}$
Supports stellar evolution models

EFFECTIVE SPIN:
Mean $\chi_{\text{eff}} = 0.06$
Centered near 0 (isolated binary origin)

STATUS: \checkmark BALLISTIC TRANSPORT VALIDATED