PhysInformer Auxiliary Heads: Do Physics Features Predict Gene Activity?
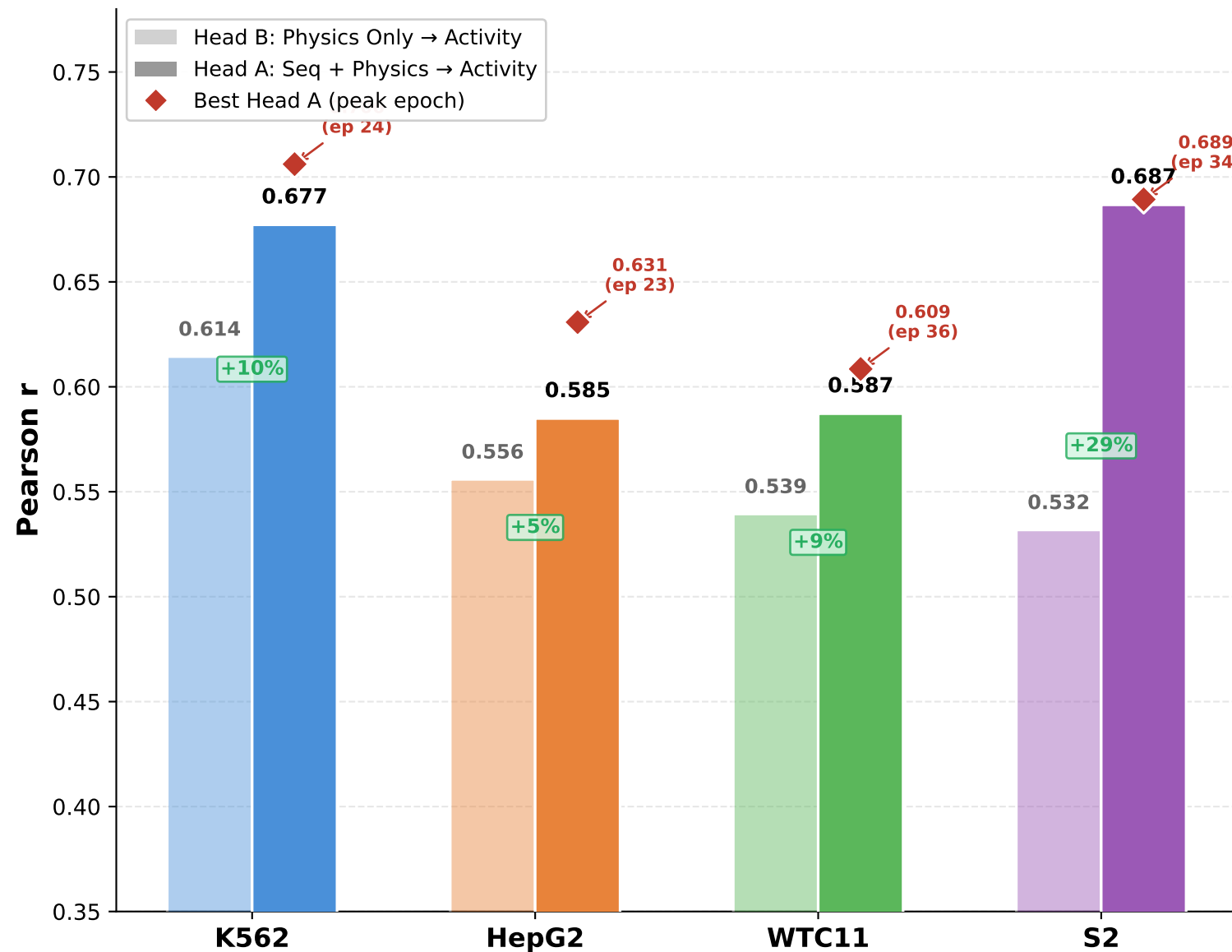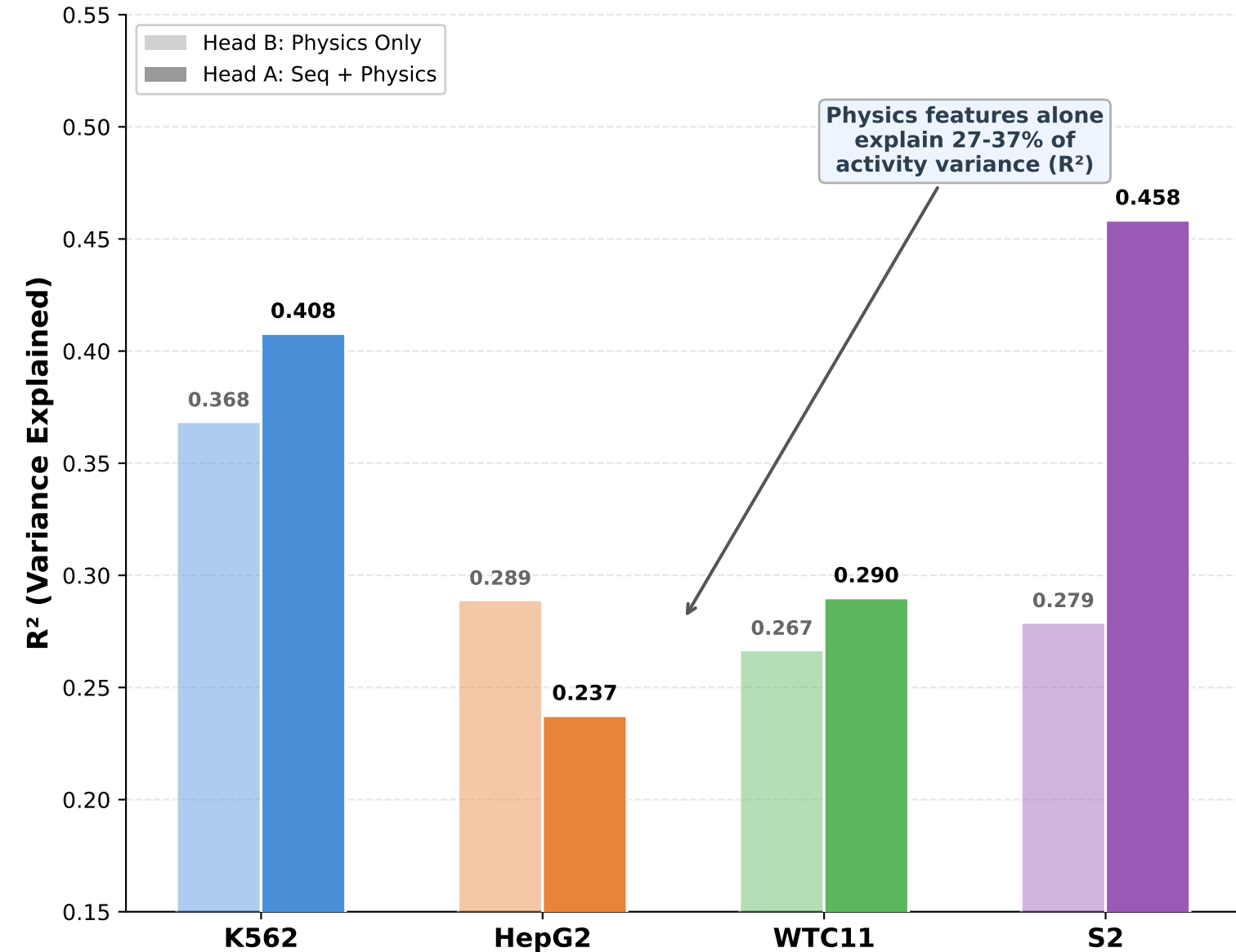
Auxiliary Heads: Activity Prediction from Physics Features

Legend:
- Head B: Physics Only → Activity
- Head A: Seq + Physics → Activity
- Best Head A (peak epoch)

Y-axis: Pearson r

K562: 0.614 (Head B), 0.677 (Head A), +10%, 0.706 (ep 24)
HepG2: 0.556 (Head B), 0.585 (Head A), +5%, 0.631 (ep 23)
WTC11: 0.539 (Head B), 0.587 (Head A), +9%, 0.609 (ep 36)
S2: 0.532 (Head B), 0.687 (Head A), +29%, 0.689 (ep 34)

Physics Features Explain 27-46% of Activity Variance

Legend:
- Head B: Physics Only
- Head A: Seq + Physics

Y-axis: R² (Variance Explained)

Physics features alone explain 27-37% of activity variance (R²)

K562: 0.368 (Head B), 0.408 (Head A)
HepG2: 0.289 (Head B), 0.237 (Head A)
WTC11: 0.267 (Head B), 0.290 (Head A)
S2: 0.279 (Head B), 0.458 (Head A)

Head A (sequence + physics) consistently outperforms Head B (physics only) — sequence context adds signal beyond raw physics