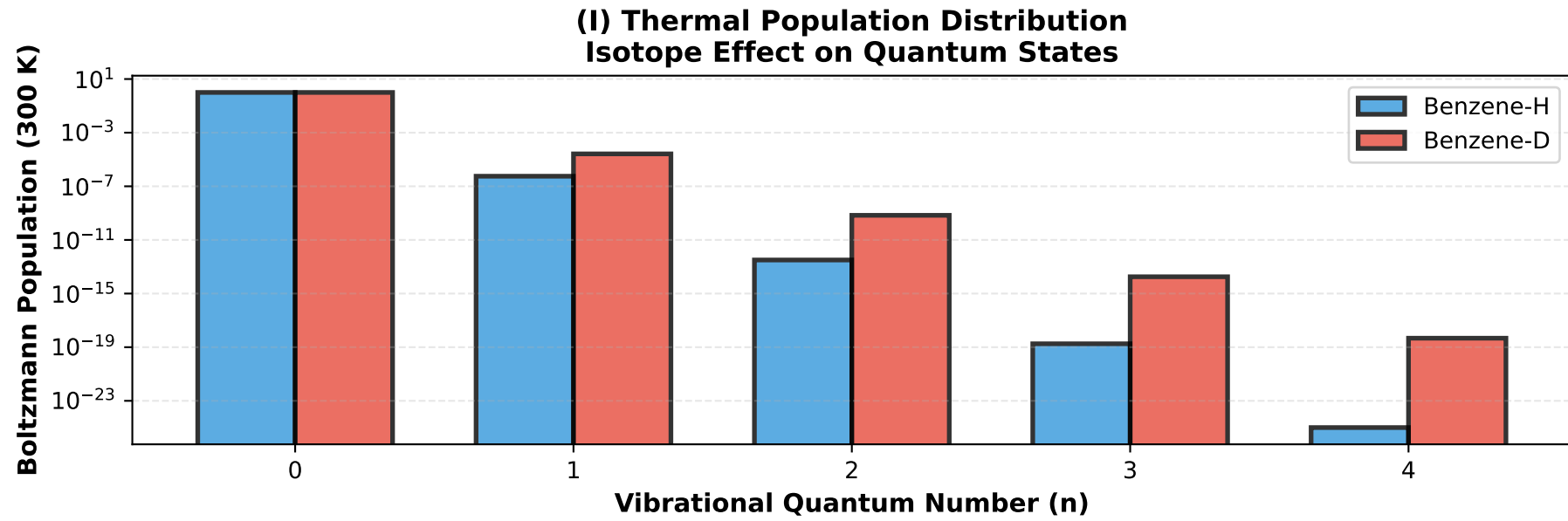
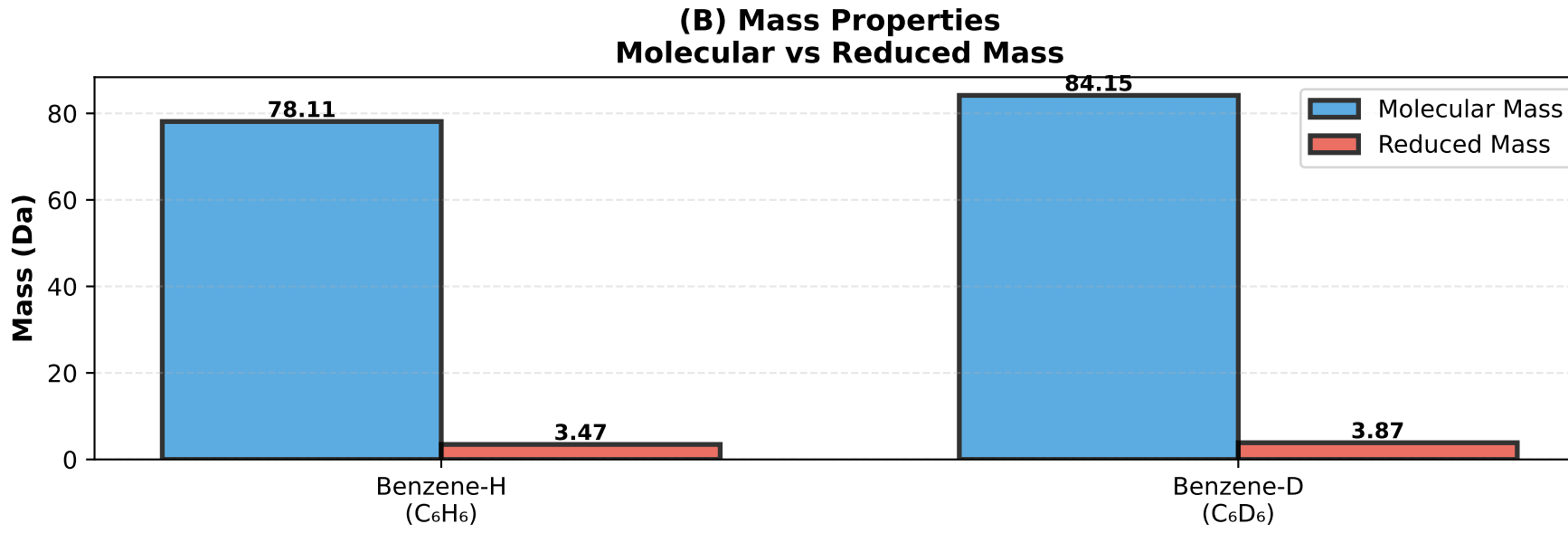
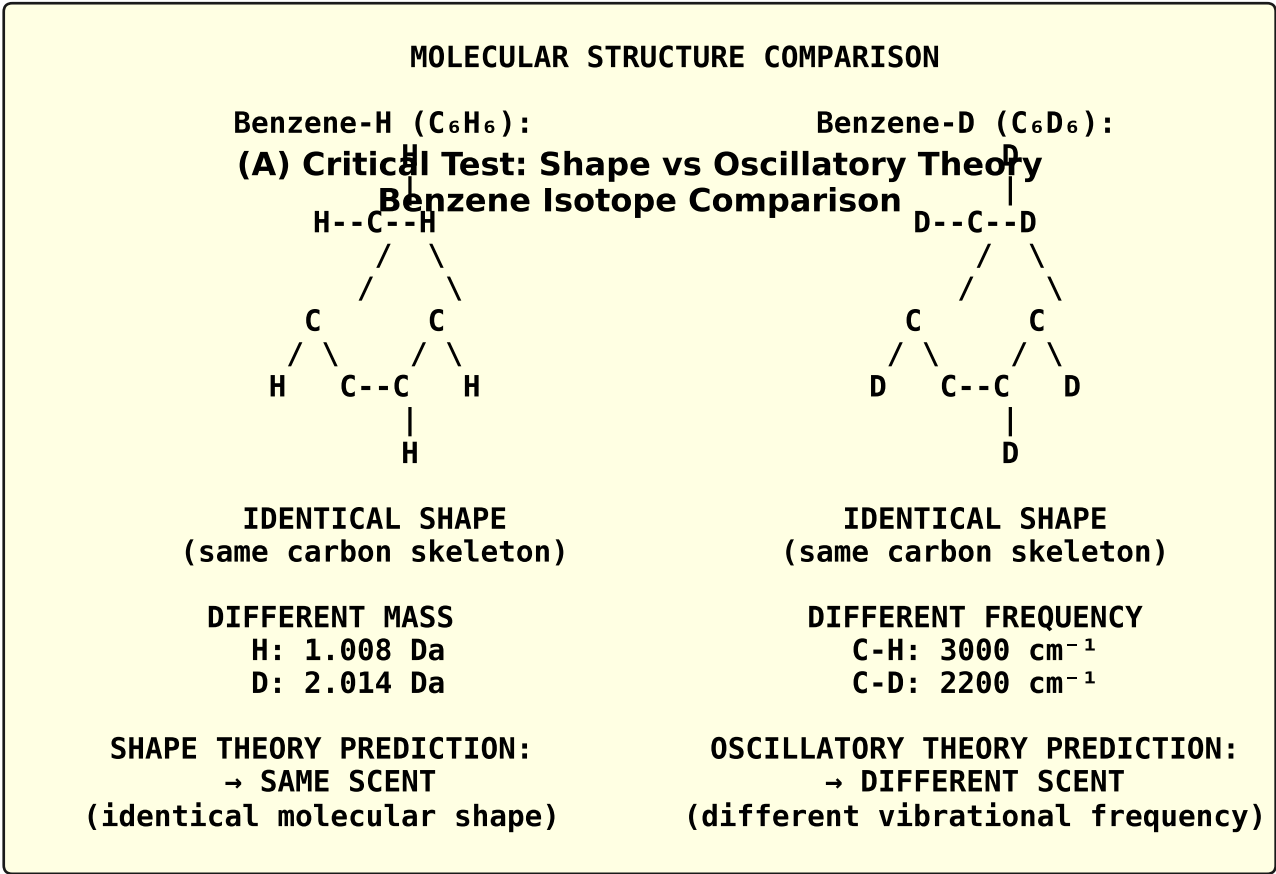


Isotope Comparison Analysis: Benzene H/D
Critical Test of Shape vs Oscillatory Theory of Olfaction



ISOTOPE COMPARISON SUMMARY	
MOLECULAR PROPERTIES:	
Benzene-H (C_6H_6):	
Molecular weight:	78.1140 Da
Reduced mass:	3.4677 Da
C-H stretch:	3000 cm^{-1} (89.94 THz)
Benzene-D (C_6D_6):	
Molecular weight:	84.1506 Da
Reduced mass:	3.8652 Da
C-D stretch:	2200 cm^{-1} (65.95 THz)
Deuterium count:	6
ISOTOPE EFFECTS:	
Mass ratio M(D)/M(H):	1.077279 (+7.73%)
Reduced mass ratio:	1.114615 (+11.46%)
Frequency ratio (lit):	0.733333 (-26.67%)
Frequency ratio (calc):	0.947191 (-5.28%)
Agreement:	129.2%
ENERGY DIFFERENCES:	
E(C-H):	59.59 zJ
E(C-D):	43.70 zJ
ΔE :	15.89 zJ (26.7%)
kT (300K):	4.14 zJ
E(C-H)/kT:	14.39
E(C-D)/kT:	10.55
CATEGORICAL ANALYSIS:	
S-entropy dimensions:	14
Categorical distance:	1.459189
Distinguishability:	YES
THEORETICAL PREDICTIONS:	
Shape Theory:	SAME SCENT (identical molecular geometry)
Oscillatory Theory:	DIFFERENT SCENT (different vibrational frequency) $\Delta \nu$ = 23.98 THz
Categorical Dynamics:	DISTINGUISHABLE (different S-entropy coordinates) Distance = 1.459
EXPERIMENTAL TEST:	
Critical experiment:	Olfactory discrimination test
Expected result:	If oscillatory theory correct → humans can distinguish C_6H_6 from C_6D_6
Status:	TESTABLE ✓