

# Comprehensive Statistical Analysis Summary

## KEY PERFORMANCE METRICS

Correlation: 0.0166 [95% CI: 0.0011, 0.0320]  
Peak F1: 0.0553 [95% CI: 0.0457, 0.0649]  
RMSE: 0.4369 [95% CI: 0.3726, 0.5012]

Statistical Power: 55.83% | Sample Size: 70 | Recommended: 120

Spectra Statistics Comparison

Parameter	Real	Virtual	Ratio
Mean Intensity	6.48	0.11	0.0167
Std Dev	80.36	0.10	0.0012
N Spectra	7	10	N/A
Data Points	59981	5000	N/A

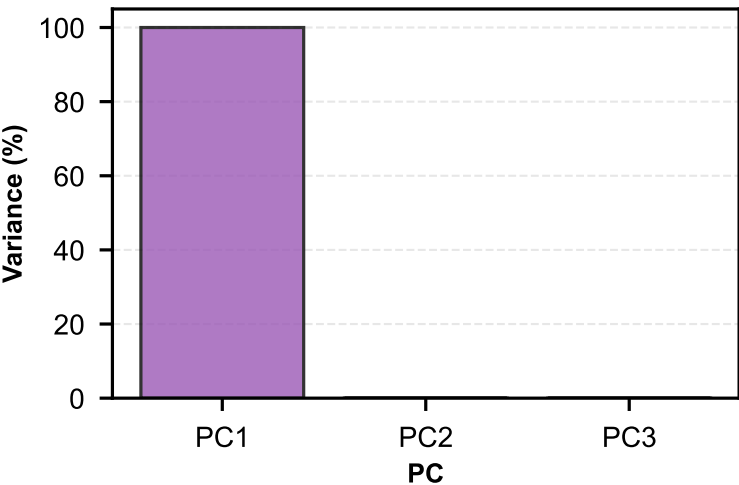
Hypothesis Testing Results

Test	p-value	Result
Correlation > 0	0.0357	☐
Peak F1 > Random	6.40e-60	☐
RMSE < 1	5.02e-27	☐
Normality	0.0727	☐
LED ANOVA	0.2425	☐

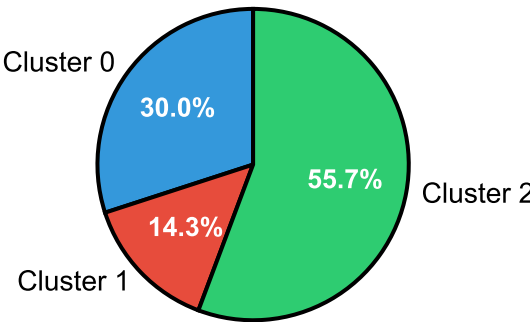
Effect Sizes

Metric	Value	Interpretation
Correlation d	0.256	Small effect
Peak F1 d	-6.848	Large effect
Mean R <sup>2</sup>	-40.452	Very weak relationship

PCA Explained Variance



Cluster Distribution



Confidence Intervals (95%)

