Ablation Results: Cross-Encoding & Downsampling

This table presents separation ratio and F1-score under different embedding variants and downsampling rates.

Variant	Param	Downsample	Separation	F1-Score
base	p=0	1	0.85	0.92
base	p=0	2	0.83	0.90
base	p=0	5	0.79	0.88
shift	$\varphi=\pi/4$	1	0.87	0.93
shift	$\varphi=\pi/4$	2	0.84	0.91
shift	$\varphi=\pi/4$	5	0.80	0.89

Observations:

- Separation degrades gracefully with downsampling.
- Shifted variant consistently outperforms base by ~0.02.