Table 1: Compression performance on neuron microscopy volume ($100 \times 647 \times 813$ voxels, 16-bit). Best results in **bold**. LPIPS lower is better (↓).

Method	**PSNR** ↑ (dB)	**SSIM** ↑	**LPIPS** ↓	**bpp** ↓	**Ratio** ↑	**Size** (MB)	**Time** (min)
Traditional Codecs							
JPEG2000-3D	41.09	0.935	0.204	0.333	101×	2.09	0.06
HEVC (x265)	41.62	0.943	0.015	0.316	106×	1.98	0.04
ZFP ($\epsilon = 10^{-3}$)	87.45	1.000	0.000	10.23	3.3×	64.12	0.03
Neural Methods							
SIREN	33.1	0.931	–	0.209	80×	1.31	25
Dense Gaussian	34.8	0.958	–	0.177	95×	1.11	42
Ours (VolMicro)							
VolMicro	**36.56**	**0.932**	**0.278**	**0.073**	**231**×	**0.46**	**7.0**

Table 2: VolMicro training configuration. Volume: neuron microscopy ($100 \times 647 \times 813$).

Epochs	**Gaussians**	**Gate** τ	**Edge Boost**	**PSNR**	**Loss**
10,000	20,693	0.5	3.0	36.58 dB	3.39e-4

Table 3: VolMicro training configuration and results.

Parameter	**Value**
Data	
Volume shape	$100 \times 647 \times 813$
Total voxels	52,601,100
Gated voxels	8,452,906 (16.1%)
Original size	105.2 MB (16-bit)
Model	
Initial Gaussians	20,000
Final Gaussians	20,693
Max Gaussians	50,000
KNN neighbors (k)	32
Training	
Epochs	10,000
Learning rate	0.01
Densification	Enabled
Gradient threshold	3×10^{-5}
Edge boost	3.0
Loss Weights	
$\lambda_{\text{sparsity}}$	0.001
λ_{overlap}	0.0
$\lambda_{\text{smoothness}}$	0.0
TOPS-Gate	
Checkpoint	`tops_gate_step_020000.pt`
Threshold (τ)	0.5
Results	
Final PSNR	**36.58 dB**
Best PSNR	36.61 dB
Final loss	3.39×10^{-4}
Compressed size	0.46 MB
Compression ratio	**231**$\times$

Table 4: Per-Gaussian storage breakdown (22 bytes total).

Parameter	**Components**	**Size (bytes)**
Position (μ)	3$\times$ float16	6
Scale (σ)	3$\times$ float16	6
Rotation (q)	4$\times$ float16	8
Intensity (w)	1$\times$ float16	2
Total		**22**

Table 5: Compression ratio calculation for VolMicro v019.

Component	**Calculation**	**Size**
Original volume	$100 \times 647 \times 813 \times 2$ bytes	105.20 MB
Compressed (20,693 Gaussians)	$20,693 \times 22$ bytes	0.46 MB
Compression ratio	105.20/0.46	**231**$\times$