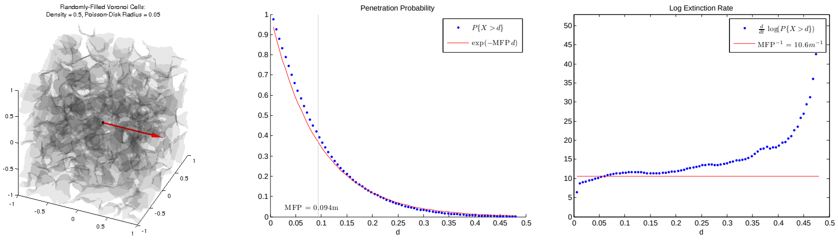

Figure 1: *Poisson-Disc Voronoi Profiles*: Here we show an empirical distribution for the penetration depth of a ray of light in a half-filled (i.e., each cell is independently, filled or empty, with probability 1/2) Poisson-Disc Voronoi partition. Comparison with an exponential decay curve shows that penetration can be accurately modeled by an exponential distribution, indexed by a single, computable, "Mean Free Path" parameter. As these Statistics scale with Poisson-Disc radius, they only need to be computed once for the entire family of Possion-Disc Voronoi Partitions.

1 Statistics of 3D Scenes

1.1 Penetration Profiles

$$\mathbb{P}_t\big[\mathcal{Y}_G(x)_{ij} = 0 \mid \mathcal{Y}_G(x)_{i-1,j} = 1\big] \approx \exp\left(\int_{\mathrm{line}(x+g_{i-1,j},\, x+g_{ij})} \frac{\log\big(\mathbb{P}_t(y \in \mathcal{A})\big)}{\log(0.5)\ \mathrm{MFP}_{0.5}}\, dy\right)$$

1.2 Computing 3D Sample Weights

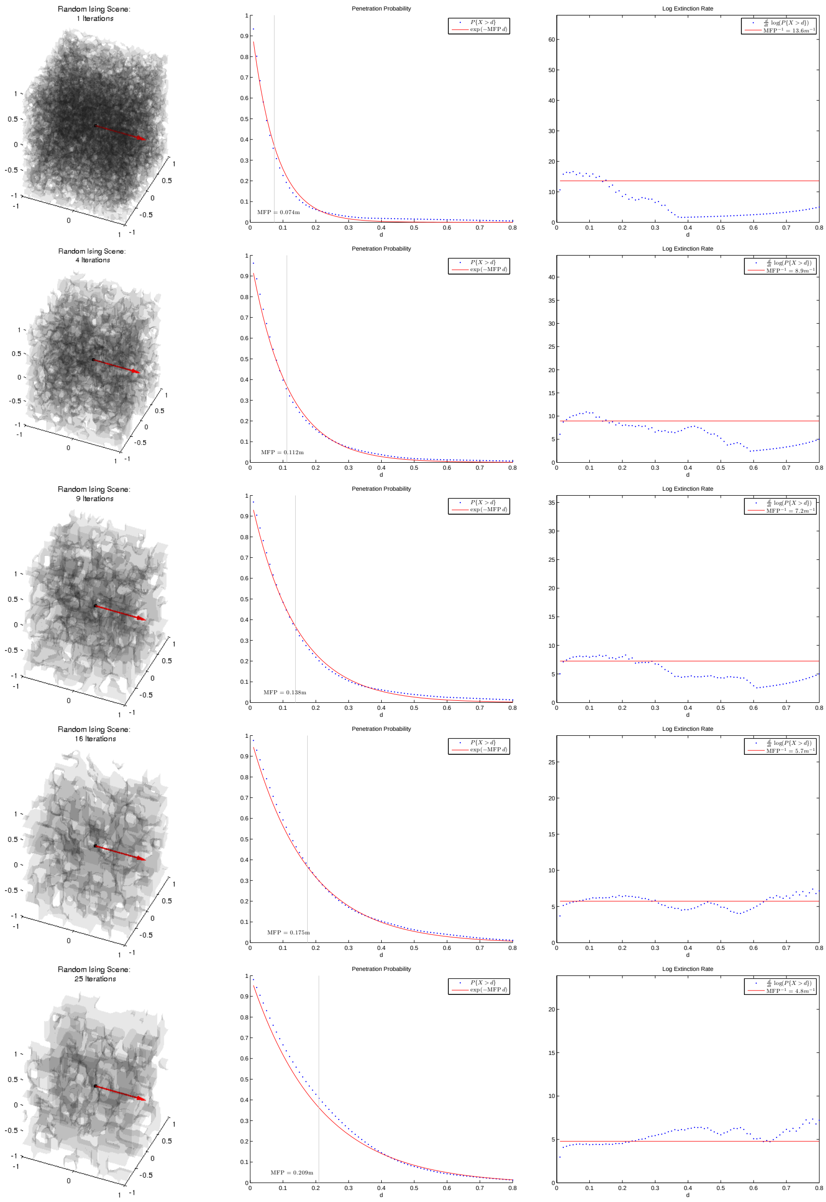

Figure 2: Here we show penetration profiles for Ising scenes with various granularities, indexed by number of update iterations.