$$A = [-\pi, \pi] \times [-1, 1]$$

A

$$(x, y) \mapsto (r, x, \sin(y)).$$

(r, θ, φ)

r

p

$$\mathbb{P}[\text{Message received}] = e^{-\frac{\pi^2}{2\sqrt{P}}},$$

P

$$\mathbb{P}[\text{Message received}] = 1 - \left(1 - e^{-\frac{\pi^2}{2\sqrt{P/N}}}\right)^N,$$