Position **Known**

$n \times m$ footprint

Flux Distribution
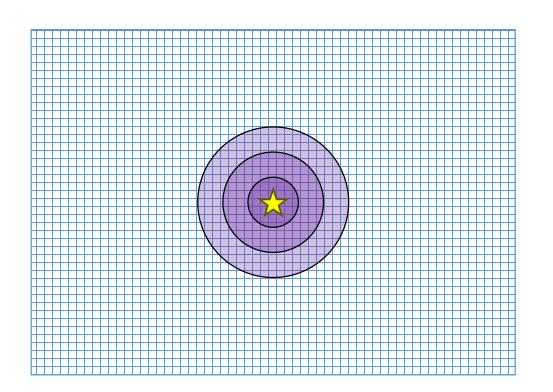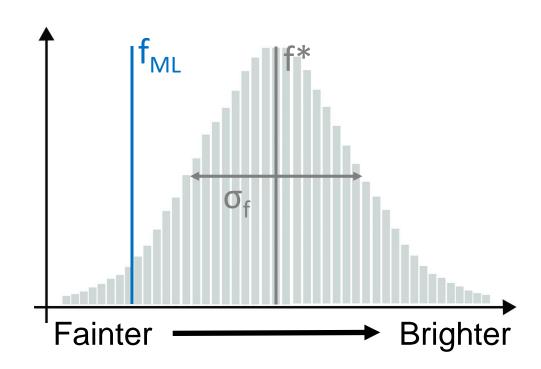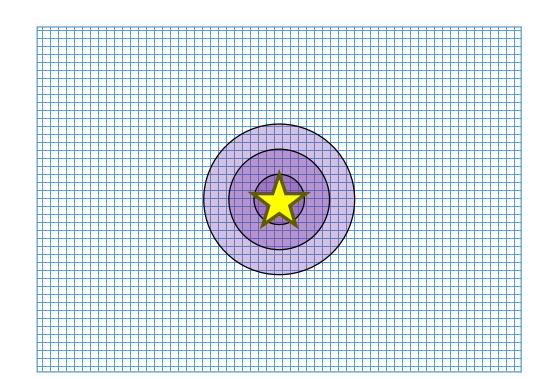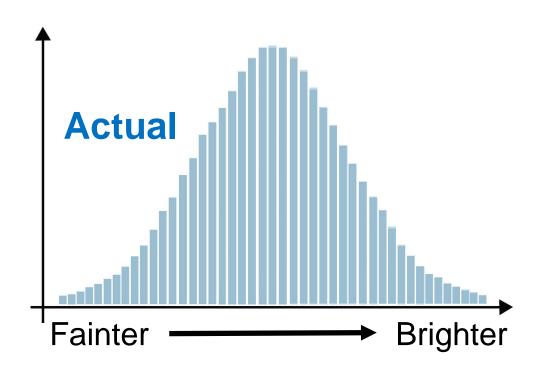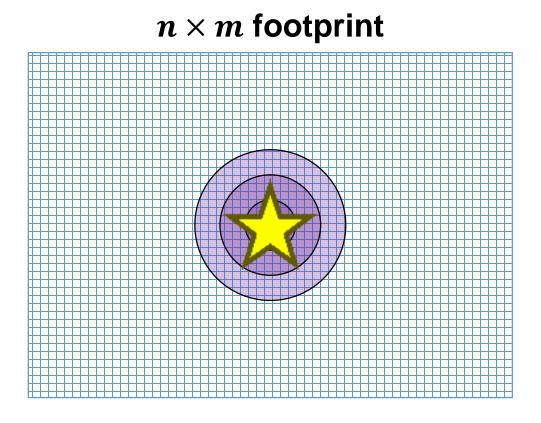
Random noise sometimes leads to high fluctuations.

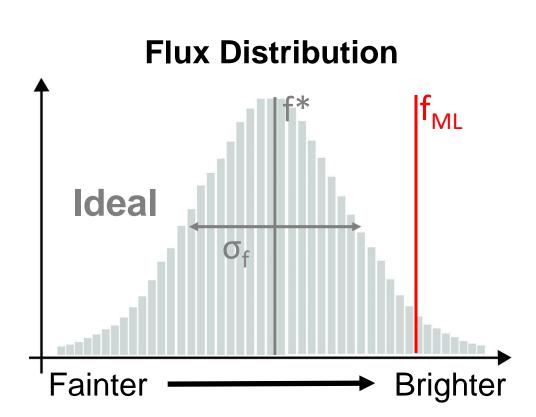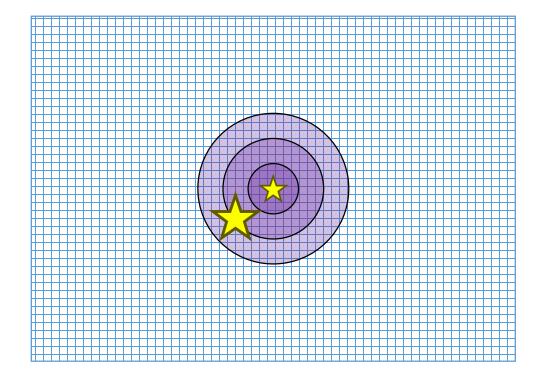It also leads to low fluctuations with equal probability.

Because fluctuations are **symmetric**,
the maximum-likelihood estimate is **unbiased**.

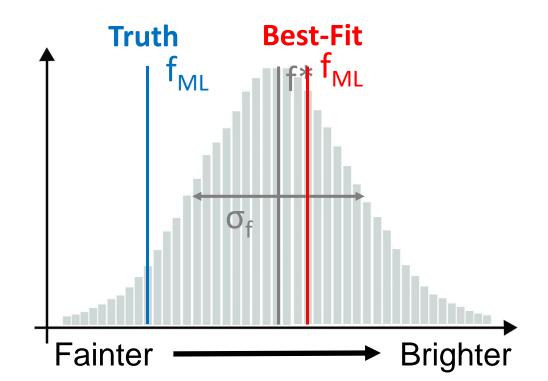# Position **Unknown**
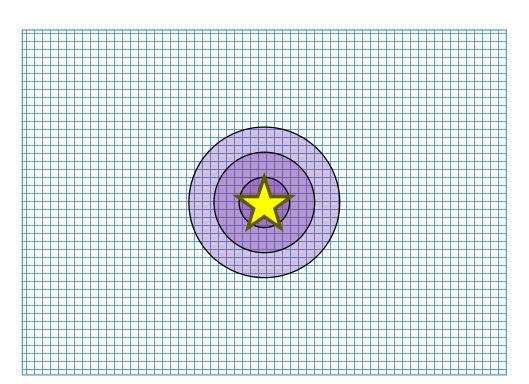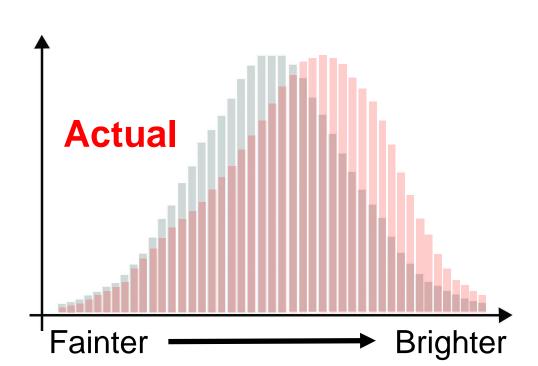
$n \times m$ footprint

Flux Distribution

The position is centered at the true position when
random noise generates high fluctuations...

But when there are low fluctuations at the true position, a
better fit can be achieved at a different position.

Because fluctuations are **asymmetric**,
the maximum-likelihood estimate is **biased**.