* Ad-Hoc WiFi Collision Avoidance Problem
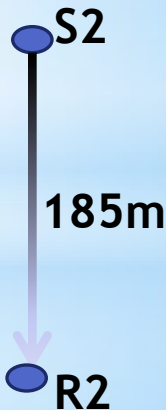
*Scenario settings

Transmission Power: 100mW,12Mbps

Noise: -100dBm

Receive power sensitivity: -105dBm

below this threshold a signal is considered as
noise instead of a packet for collision avoidance

S2

185m

R2

185m

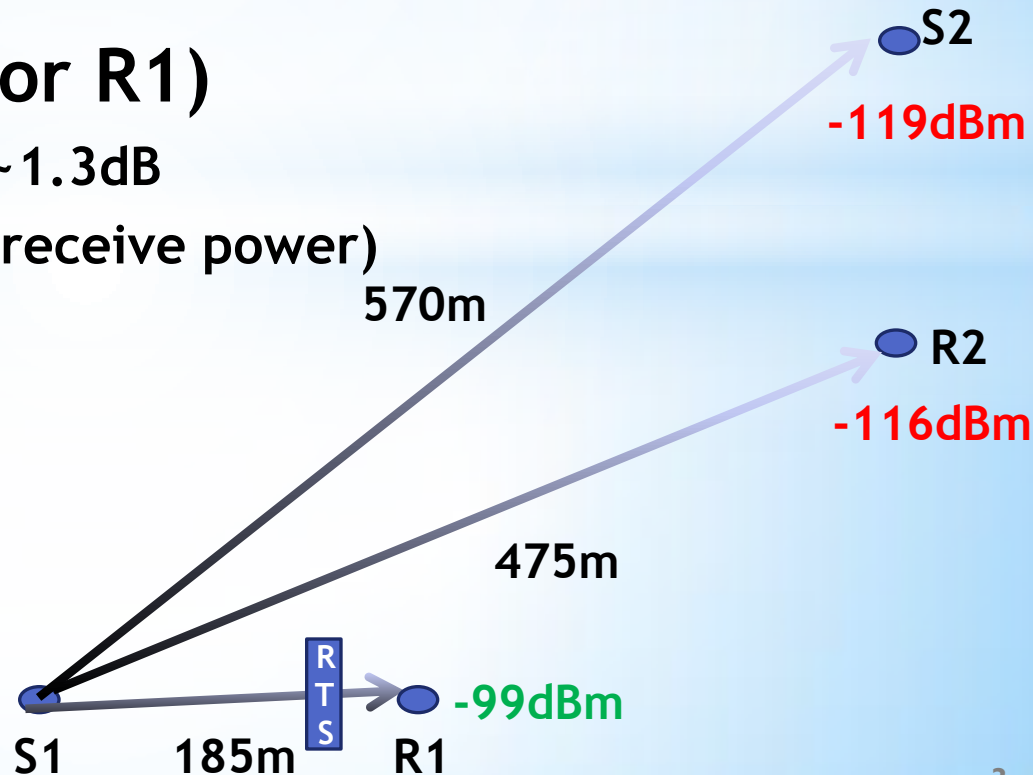S1   R1

*Scenario settings

Transmission Power: 100mW,12Mbps

Noise: -100dBm

Receive power sensitivity: -105dBm

Node S1 sends RTS (for R1)

- **Received by R1 , SNR ~1.3dB**
- **Ignored by S2,R2 (low receive power)**

S2

-119dBm

570m

R2

-116dBm

475m

R
T
S

-99dBm

S1   **185m**   **R1**

Scenario settings

Transmission Power: 100mW,12Mbps

Noise: -100dBm

Receive power sensitivity: -105dBm

Node R1 sends CTS (for S1)

- **Received by S1 , SNR ~1.3dB**
- **Ignored by S2,R2 (very low receive power)**

S2

-115dBm

R2

390m

-109dBm

-99dBm

235m

C
T
S

S1   **185m**   **R1**
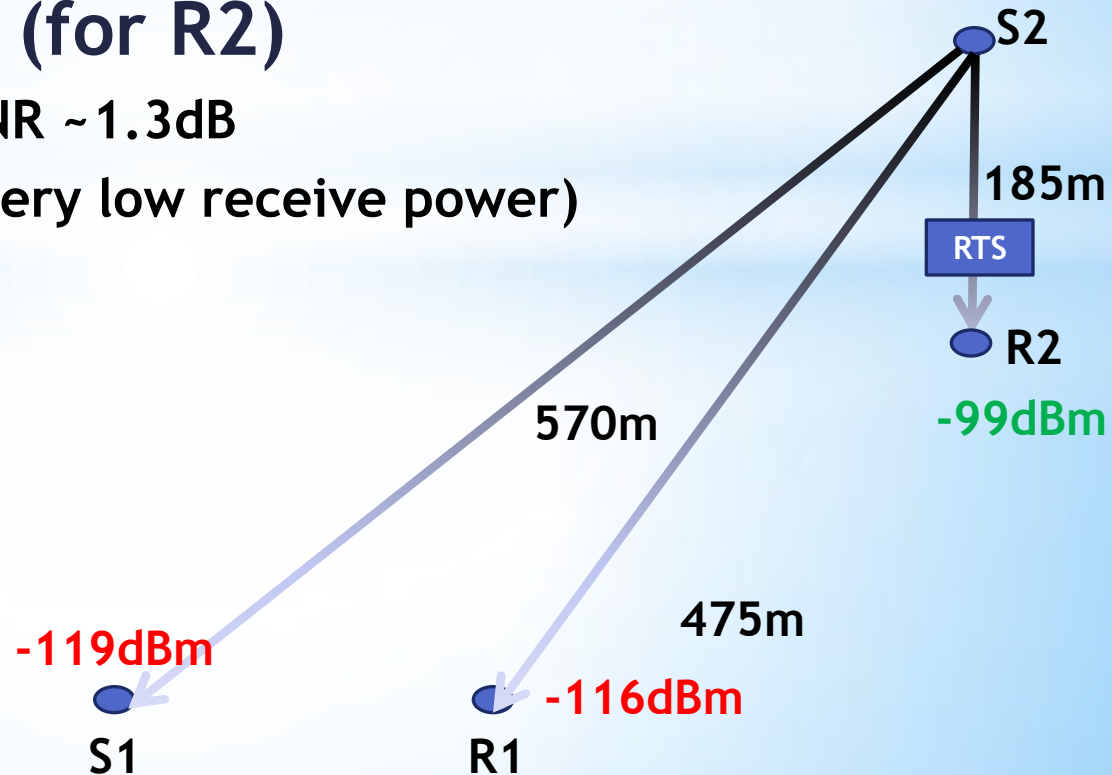
Scenario settings

Transmission Power: 100mW,12Mbps

Noise: -100dBm

Receive power sensitivity: -105dBm

Node S2 sends RTS (for R2)

- Received by R2 , SNR ~1.3dB
- Ignored by S1,R1 (very low receive power)

S2

185m

RTS

R2

-99dBm

570m

475m

-119dBm

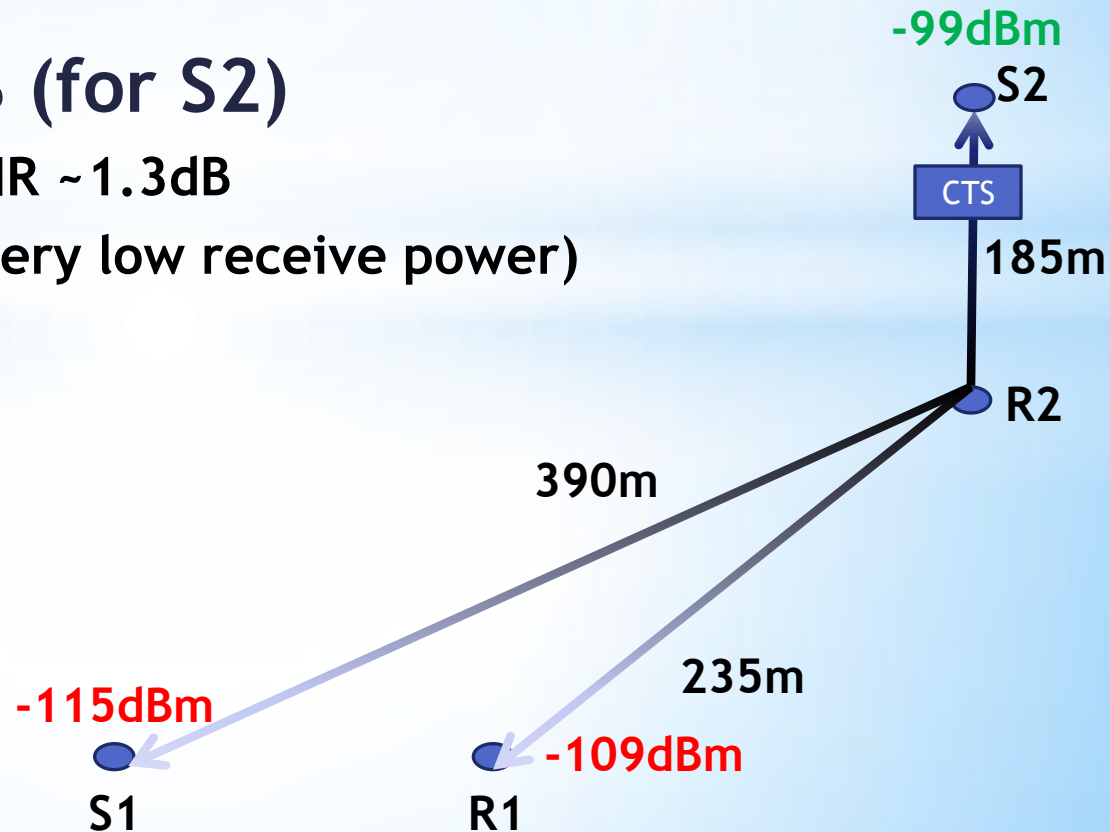-116dBm

S1

R1

Scenario settings

Transmission Power: 100mW,12Mbps

Noise: -100dBm

Receive power sensitivity: -105dBm

Node R2 sends CTS (for S2)

- **Received by S2 , SNR ~1.3dB**
- **Ignored by S1,R1 (very low receive power)**

-99dBm

S2

CTS

185m

R2

390m

235m

-115dBm
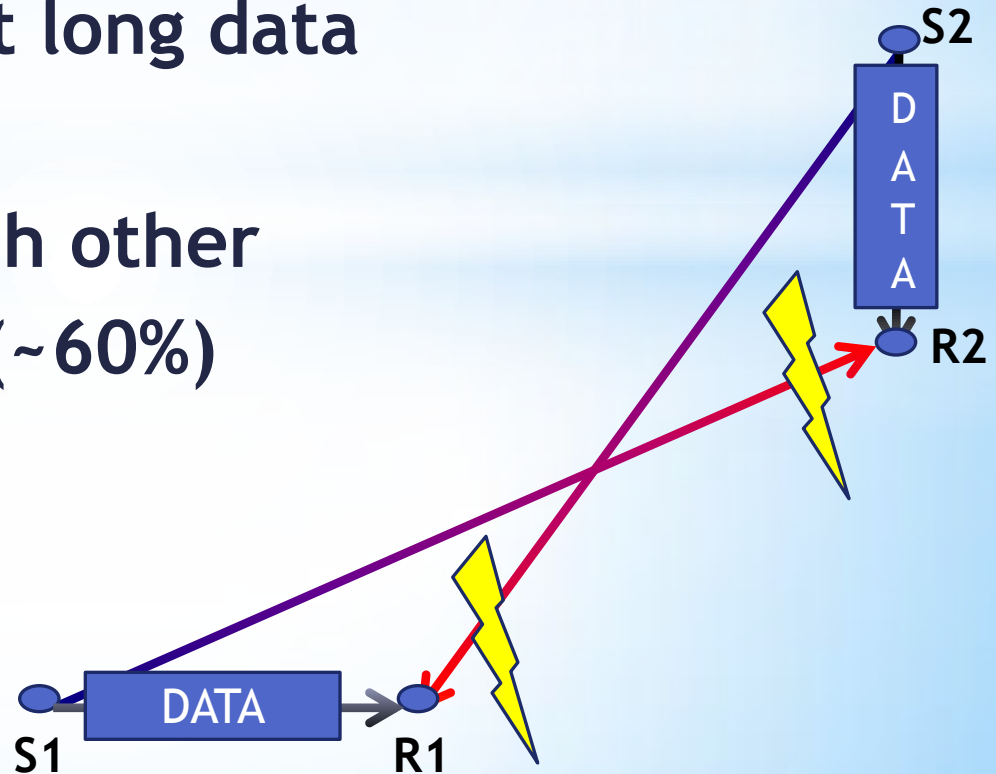
-109dBm

S1

R1

*Scenario settings

Transmission Power: 100mW,12Mbps

Noise: -100dBm

Receive power sensitivity: -105dBm

- **S1 and S2 transmit long data packets in parallel!**
- **Interfere with each other**
- **Causing high PER (~60%)**

*Proposed solution

Detect RTS packet in longer range

- Transmit 3 times short RTS packet
  - Receivers senses 3 short close "noises" -> "RTS"
  - Receivers stay quiet throughout packet duration
- Reduces PER to ~10% (without collisions)

- Can use other means for RTS:
  different signal form
  higher power or etc.

S2

R2

R
T
S
R
T
S
R
T
S

S1   R1