Rayleigh Recoveries with Realistic Parameters

Levi Walls

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Independent Variables

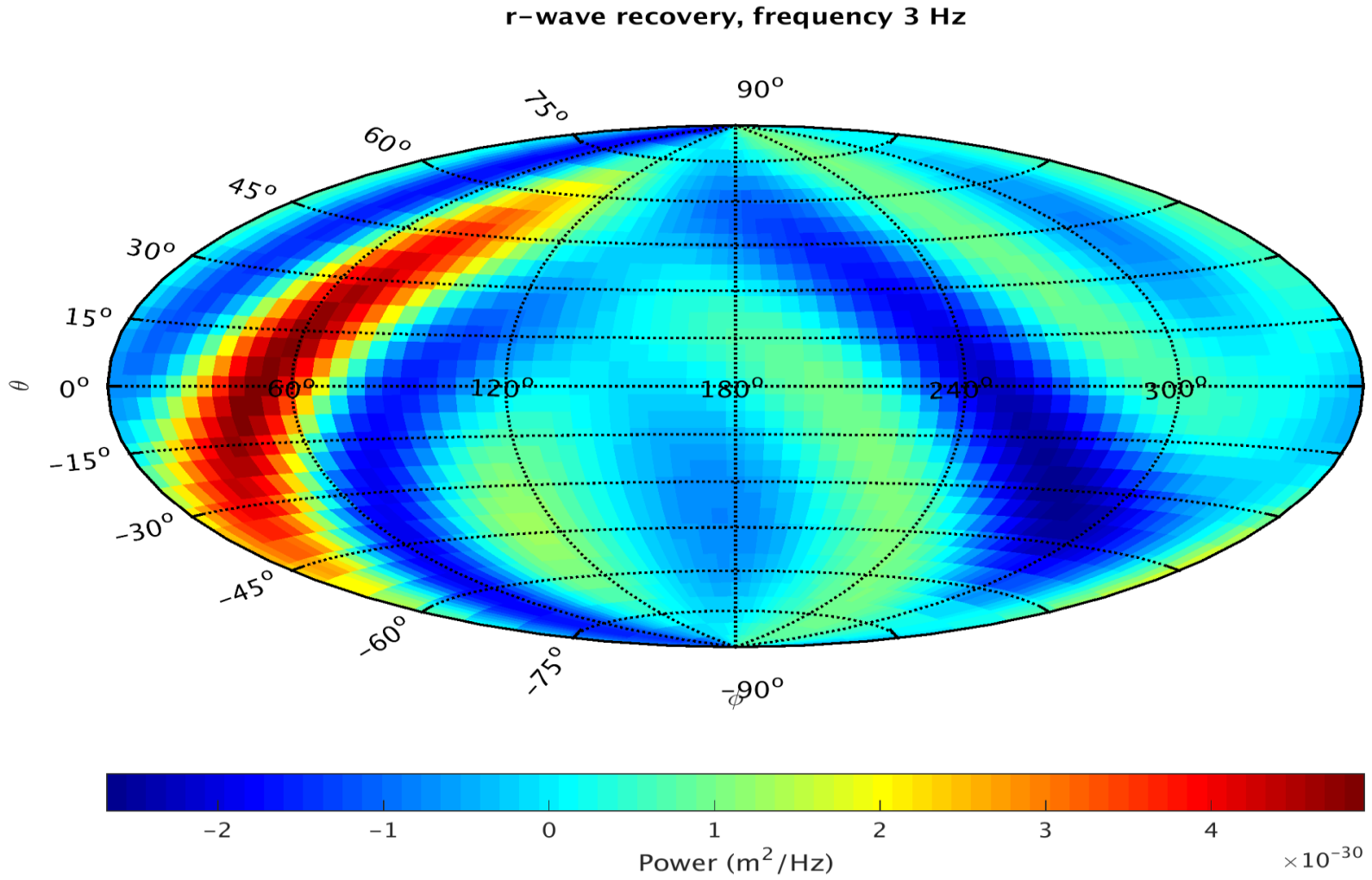
- Detectors used:
  - 300, 800, A4100, C4100, D4100, B4850, C4850, D4850, ROSS, YATES
- Channels used:
  - HHE, HHN, HHZ
- Observation time: 100 sec.
  - GPS times: 1107416000 – 1107416100
- Recovery bin size: 5°
- Used following relation to obtain α, where v_R is the wave speed, and f is the recovery frequency :

$$\alpha = \frac{v_R}{2f}$$

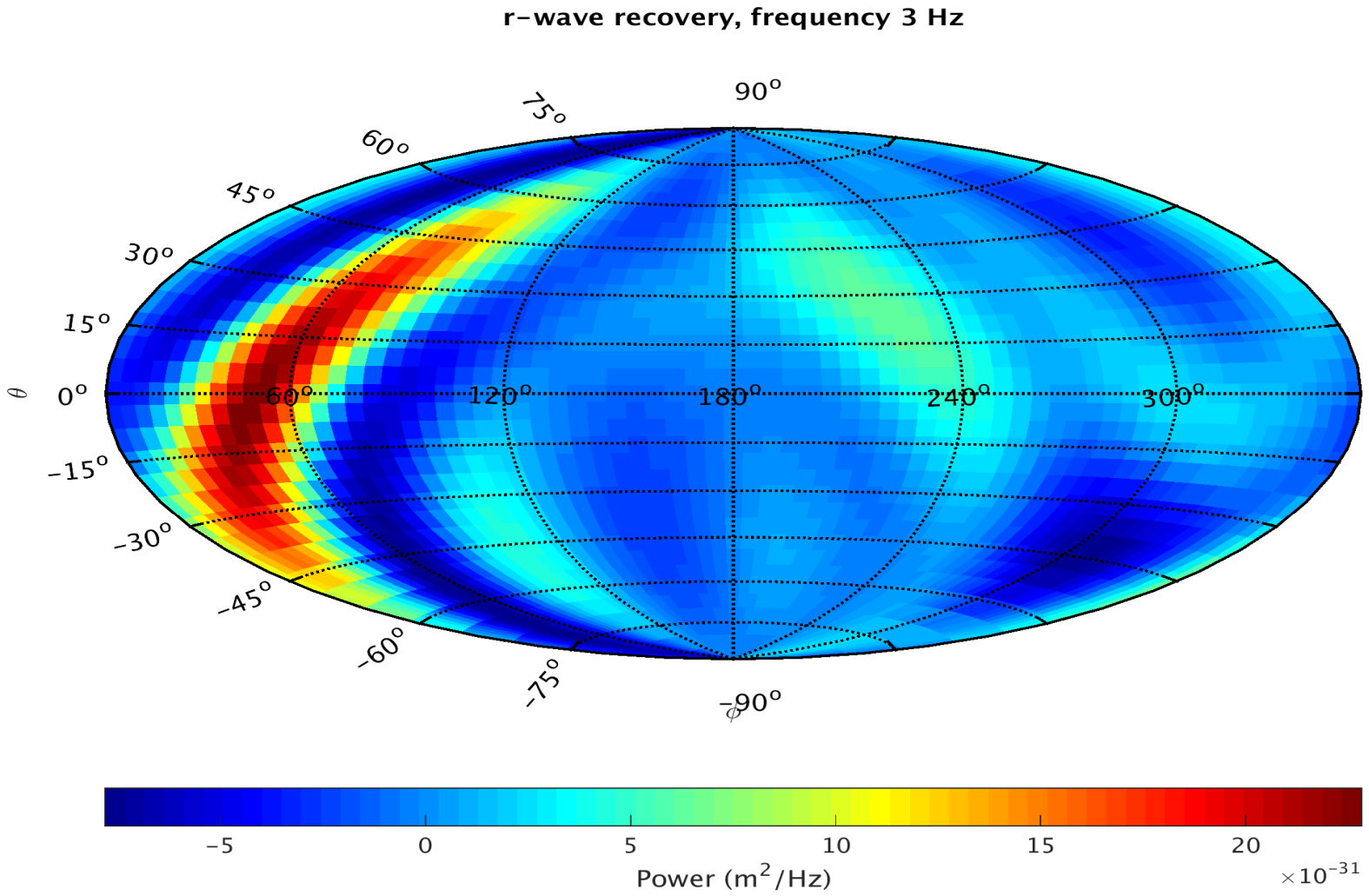
Recovery Frequency: 3 Hz

- v_R: 862 m/s
- α = 144 m
- Comments about recoveries:
  - The signals being recovered are more pronounced in their structure than the recoveries at higher recovery frequencies.
  - Even at lower values of ϵ, the structure of the signal is still pronounced.

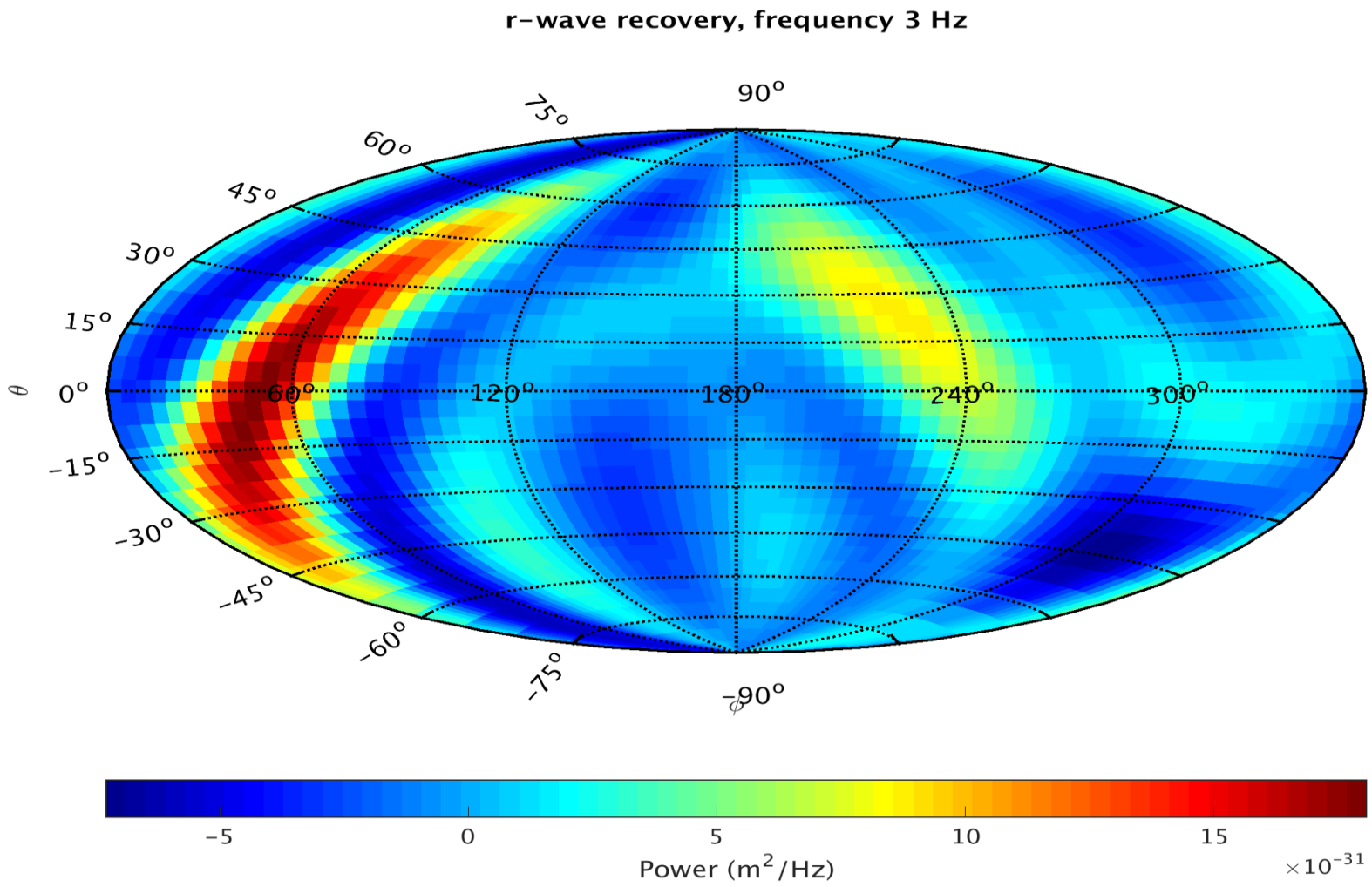
$\epsilon = 0.1$


r-wave recovery, frequency 3 Hz
90°
75°
60°
45°
30°
15°
0°
-15°
-30°
-45°
-60°
-75°
-90°
θ
60°
120°
180°
240°
300°
ϕ
−2
−1
0
1
2
3
4
Power (m²/Hz)
×10⁻³⁰

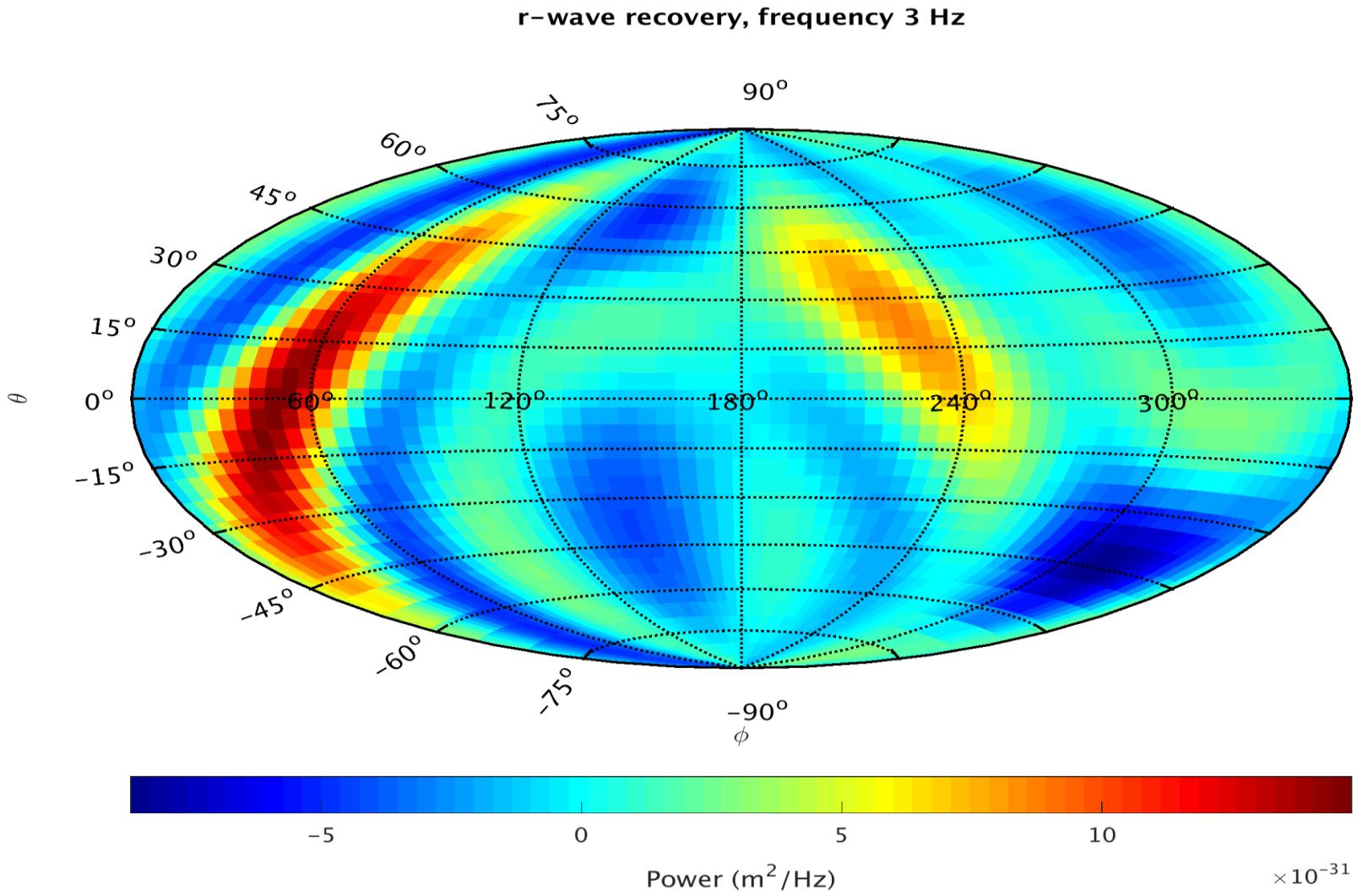
$\epsilon = 0.4$


r-wave recovery, frequency 3 Hz
90°
75°
60°
45°
30°
15°
0°
−15°
−30°
−45°
−60°
−75°
−90°
θ
ϕ
60°
120°
180°
240°
300°
−5
0
5
10
15
20
Power (m²/Hz)
×10⁻³¹

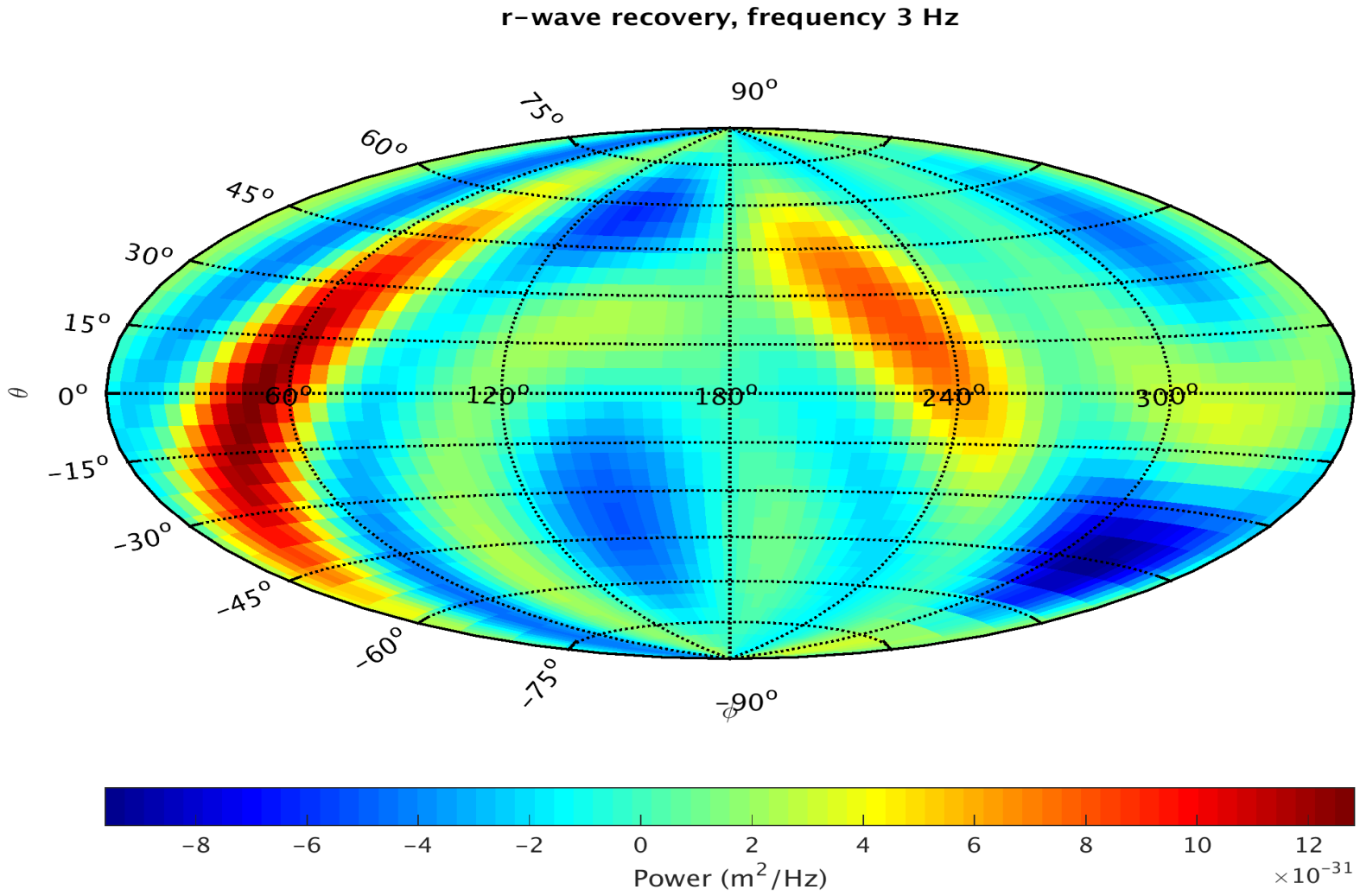
$\epsilon = 0.7$


r-wave recovery, frequency 3 Hz
90°
75°
60°
45°
30°
15°
0°
-15°
-30°
-45°
-60°
-75°
-90°
θ
60°
120°
180°
240°
300°
φ
−5
0
5
10
15
Power (m²/Hz)
×10⁻³¹

$\epsilon = 1.0$


r−wave recovery, frequency 3 Hz
90°
75°
60°
45°
30°
15°
0°
−15°
−30°
−45°
−60°
−75°
−90°
θ
60°
120°
180°
240°
300°
ϕ
−5
0
5
10
Power (m²/Hz)
×10⁻³¹

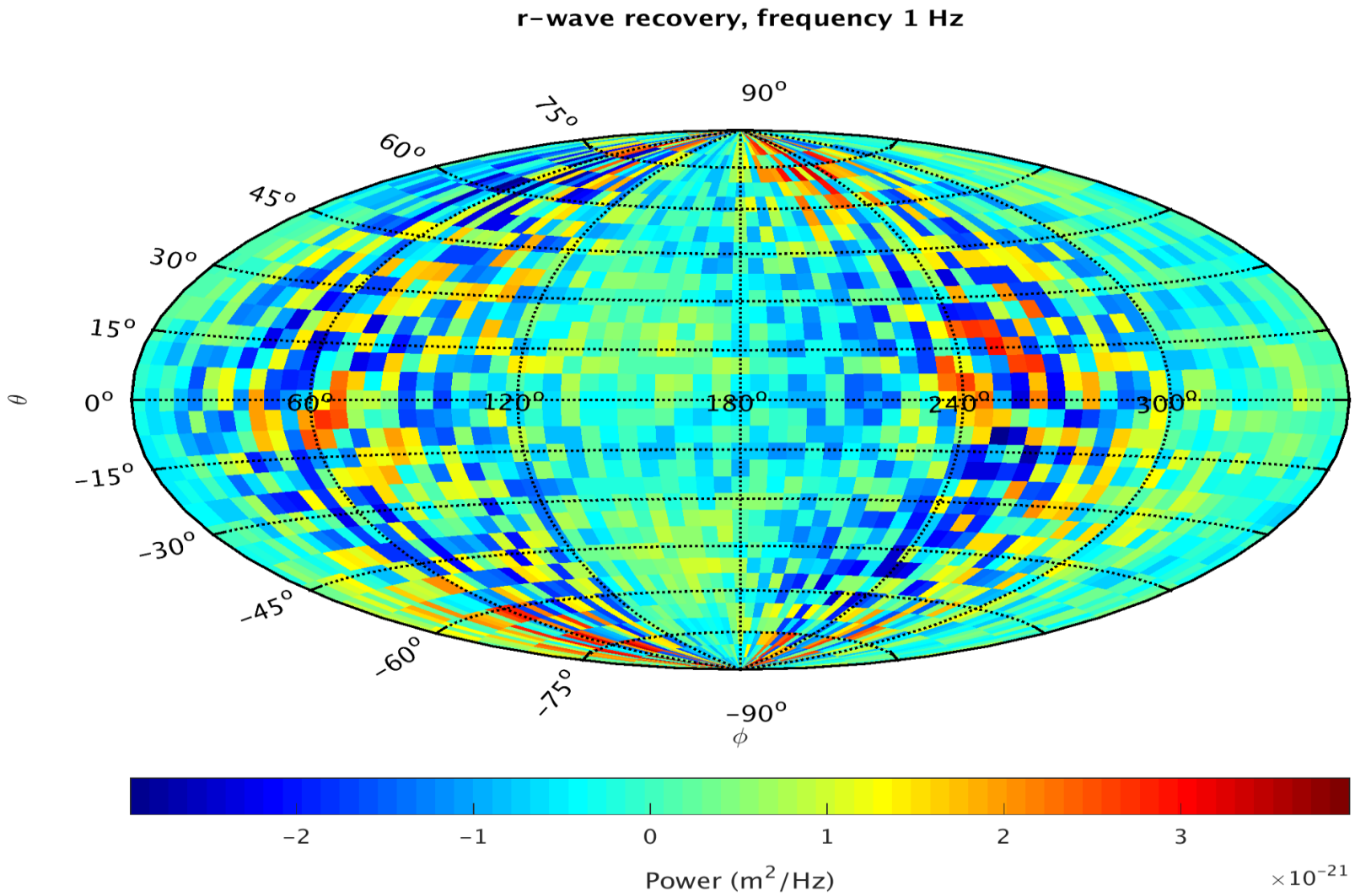
$\epsilon = 1.3$


r−wave recovery, frequency 3 Hz
90°
75°
60°
45°
30°
15°
0°
−15°
−30°
−45°
−60°
−75°
−90°
θ
60°
120°
180°
240°
300°
φ
−8
−6
−4
−2
0
2
4
6
8
10
12
Power (m²/Hz)
×10⁻³¹

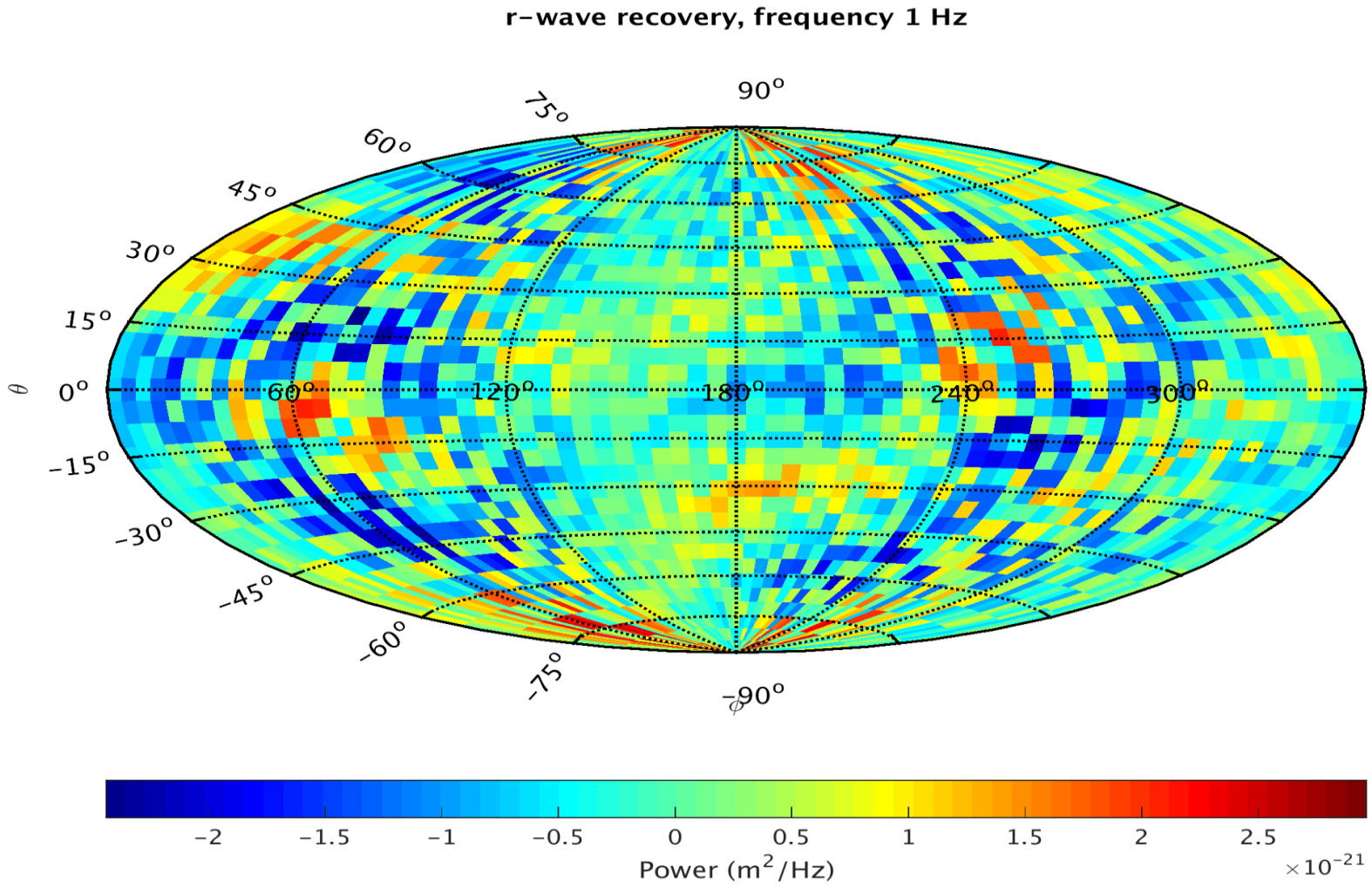
Recovery Frequency: 1 Hz

- v_R: 1,300 m/s
- α = 650 m
- Comments about recoveries:
  - "Junk" recoveries; i.e. no distinct signal was recovered—especially at low values of ϵ
  - Increasing ϵ seems to render a more prominent signal recovery; however, the power diminishes slightly (cf. slides 12 – 16)
  - These recoveries resemble the recoveries at 1 Hz with:
    - v_R: 1,809 m/s
    - α: 250 m
    - $\epsilon \in [0.7, 1.3]$

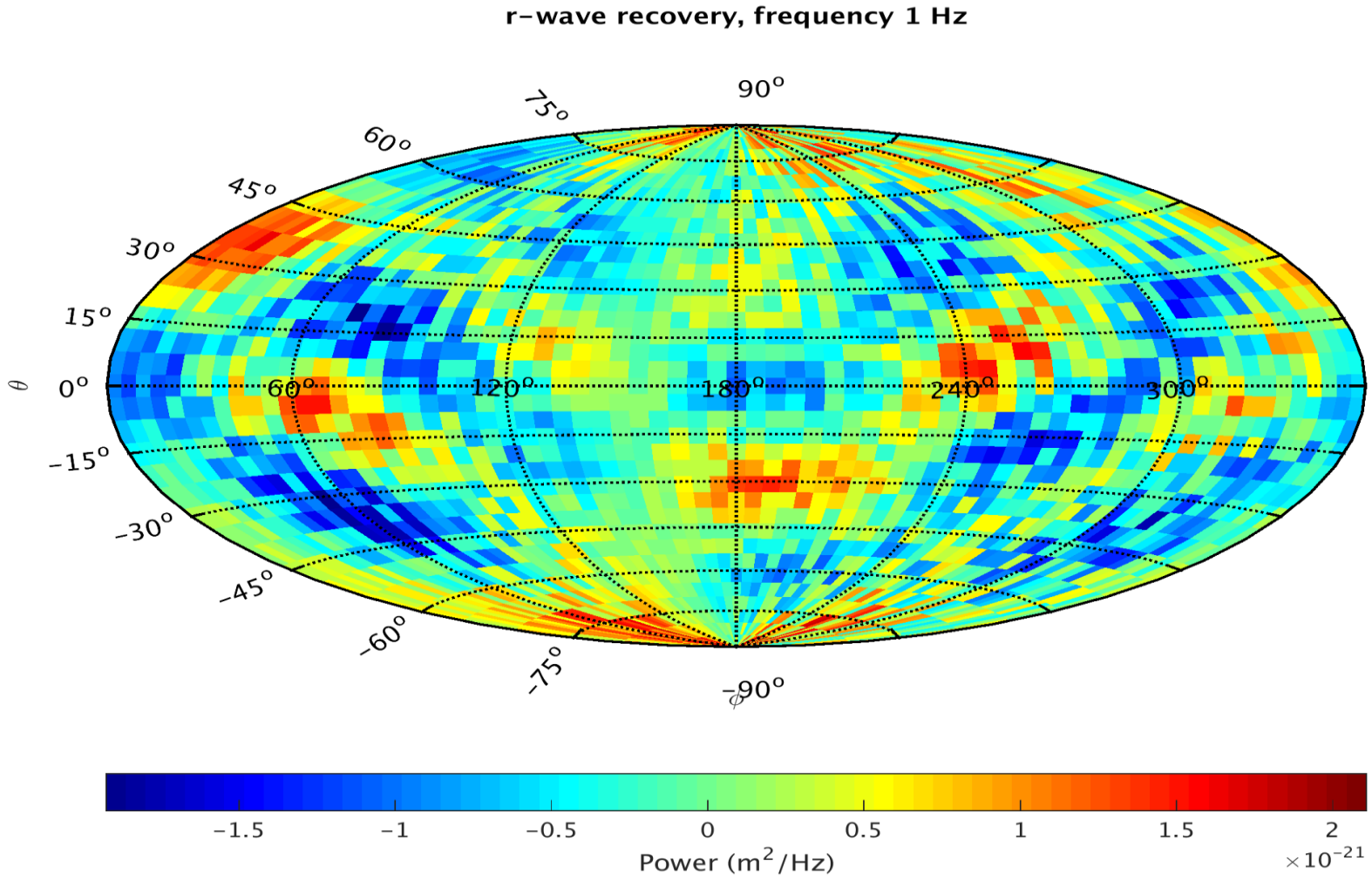
$\epsilon = 0.1$


r-wave recovery, frequency 1 Hz
90°
75°
60°
45°
30°
15°
0°
-15°
-30°
-45°
-60°
-75°
-90°
θ
ϕ
60°
120°
180°
240°
300°
−2
−1
0
1
2
3
Power (m²/Hz)
×10⁻²¹

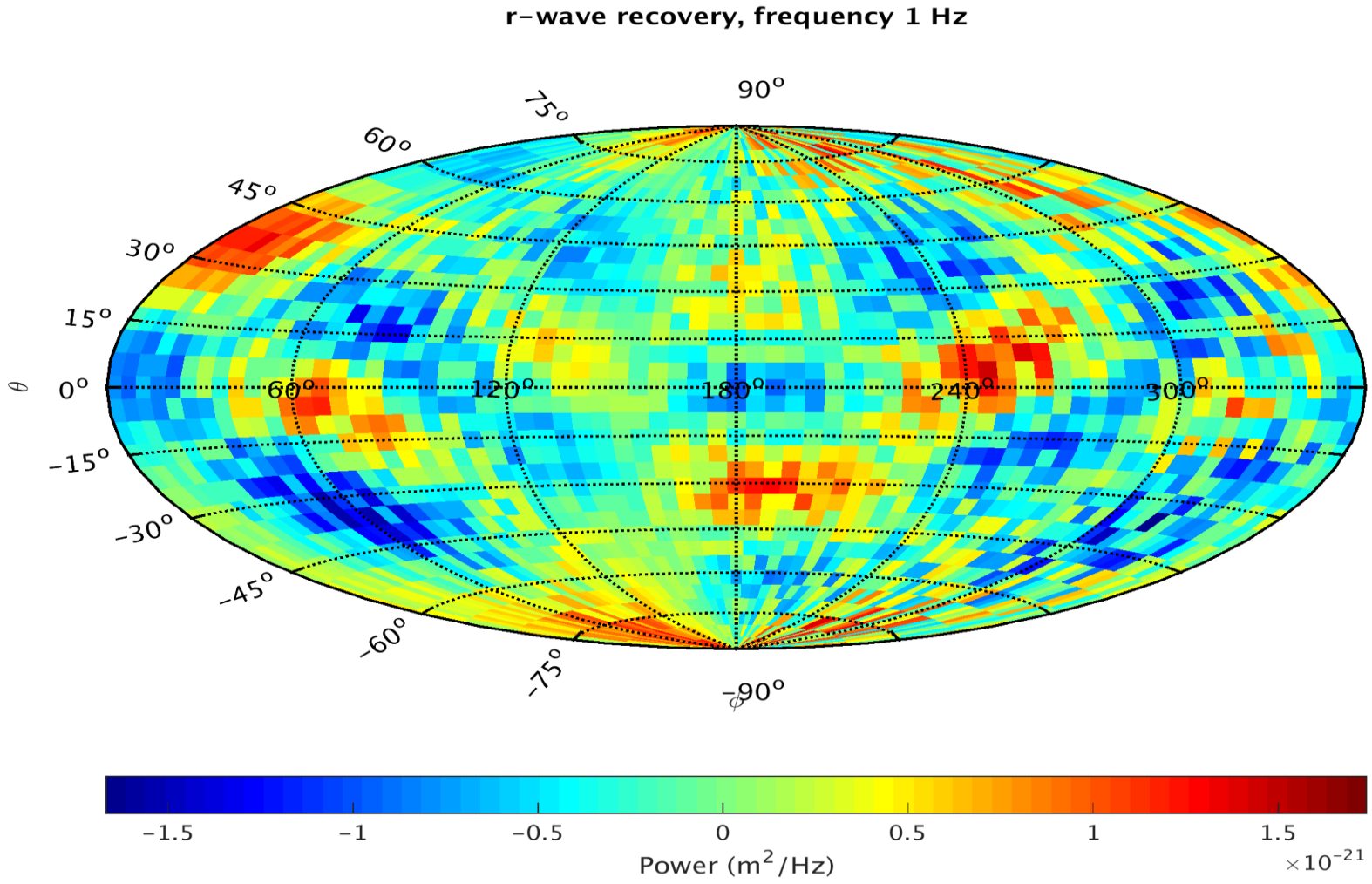
$\epsilon = 0.4$


r-wave recovery, frequency 1 Hz
90°
75°
60°
45°
30°
15°
0°
-15°
-30°
-45°
-60°
-75°
-90°
θ
60°
120°
180°
240°
300°
φ
−2
−1.5
−1
−0.5
0
0.5
1
1.5
2
2.5
Power (m²/Hz)
×10⁻²¹

$\epsilon = 0.7$


r-wave recovery, frequency 1 Hz
90°
75°
60°
45°
30°
15°
0°
−15°
−30°
−45°
−60°
−75°
−90°
θ
60°
120°
180°
240°
300°
ϕ
−1.5
−1
−0.5
0
0.5
1
1.5
2
Power (m²/Hz)
×10⁻²¹

$\epsilon = 1.0$


r-wave recovery, frequency 1 Hz
90°
75°
60°
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30°
15°
0°
-15°
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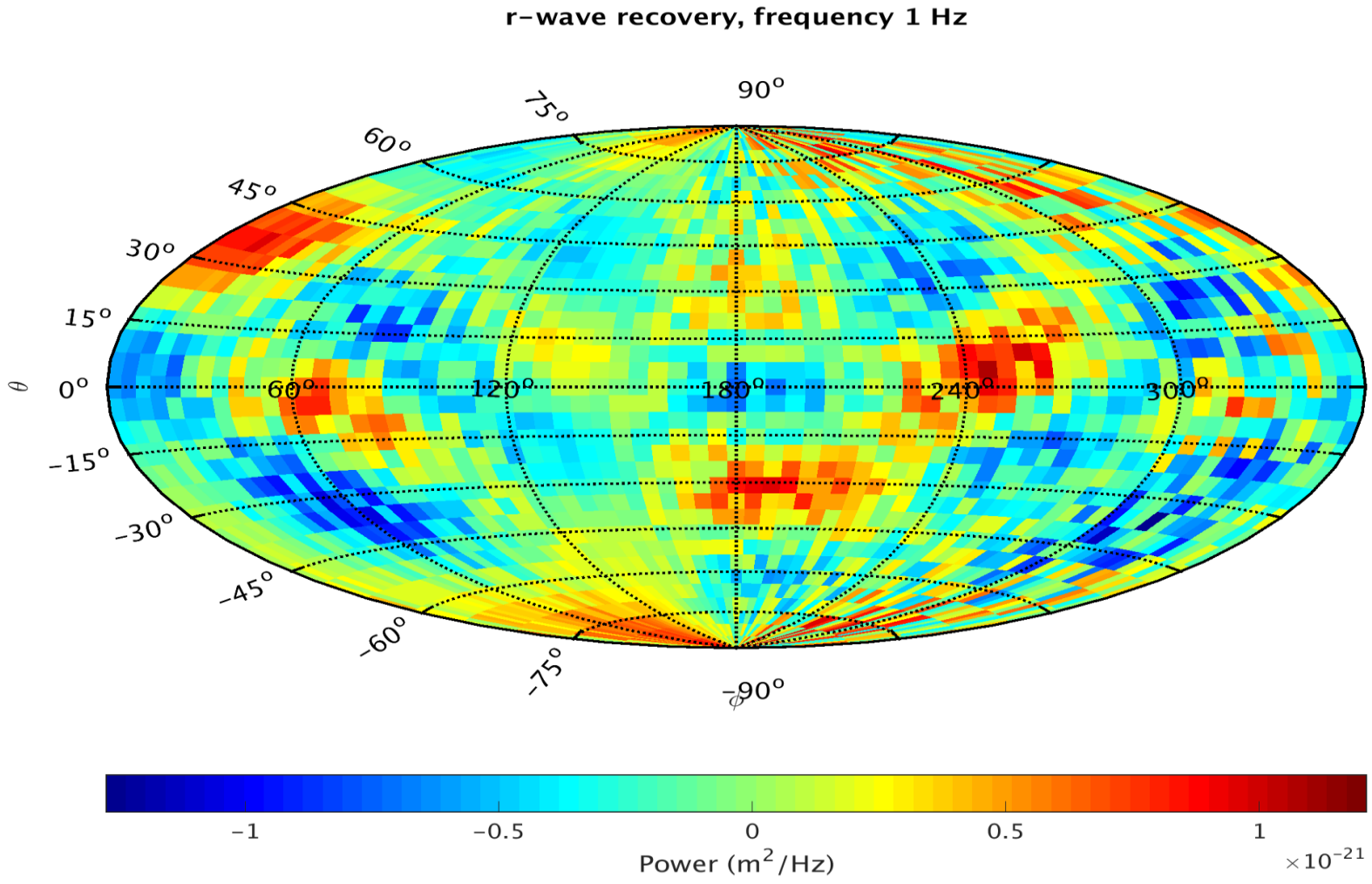
-45°
-60°
-75°
-90°
θ
60°
120°
180°
240°
300°
φ
−1.5
−1
−0.5
0
0.5
1
1.5
Power (m²/Hz)
×10⁻²¹

$\epsilon = 1.3$


r-wave recovery, frequency 1 Hz
90°
75°
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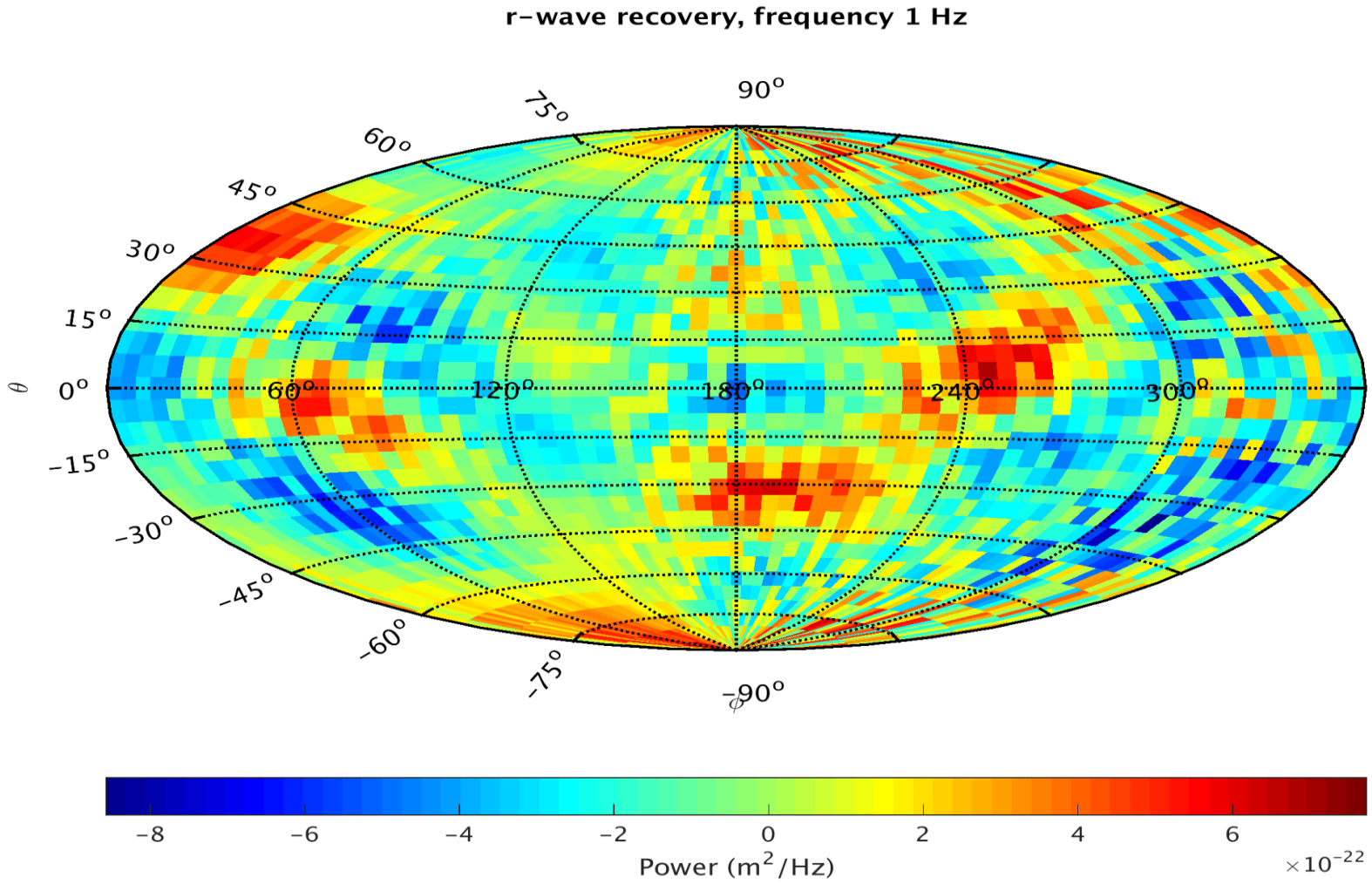
−15°
−30°
−45°
−60°
−75°
−90°
θ
60°
120°
180°
240°
300°
ϕ
−1
−0.5
0
0.5
1
Power (m²/Hz)
×10⁻²¹

$\epsilon = 1.6$


r-wave recovery, frequency 1 Hz
90°
75°
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30°
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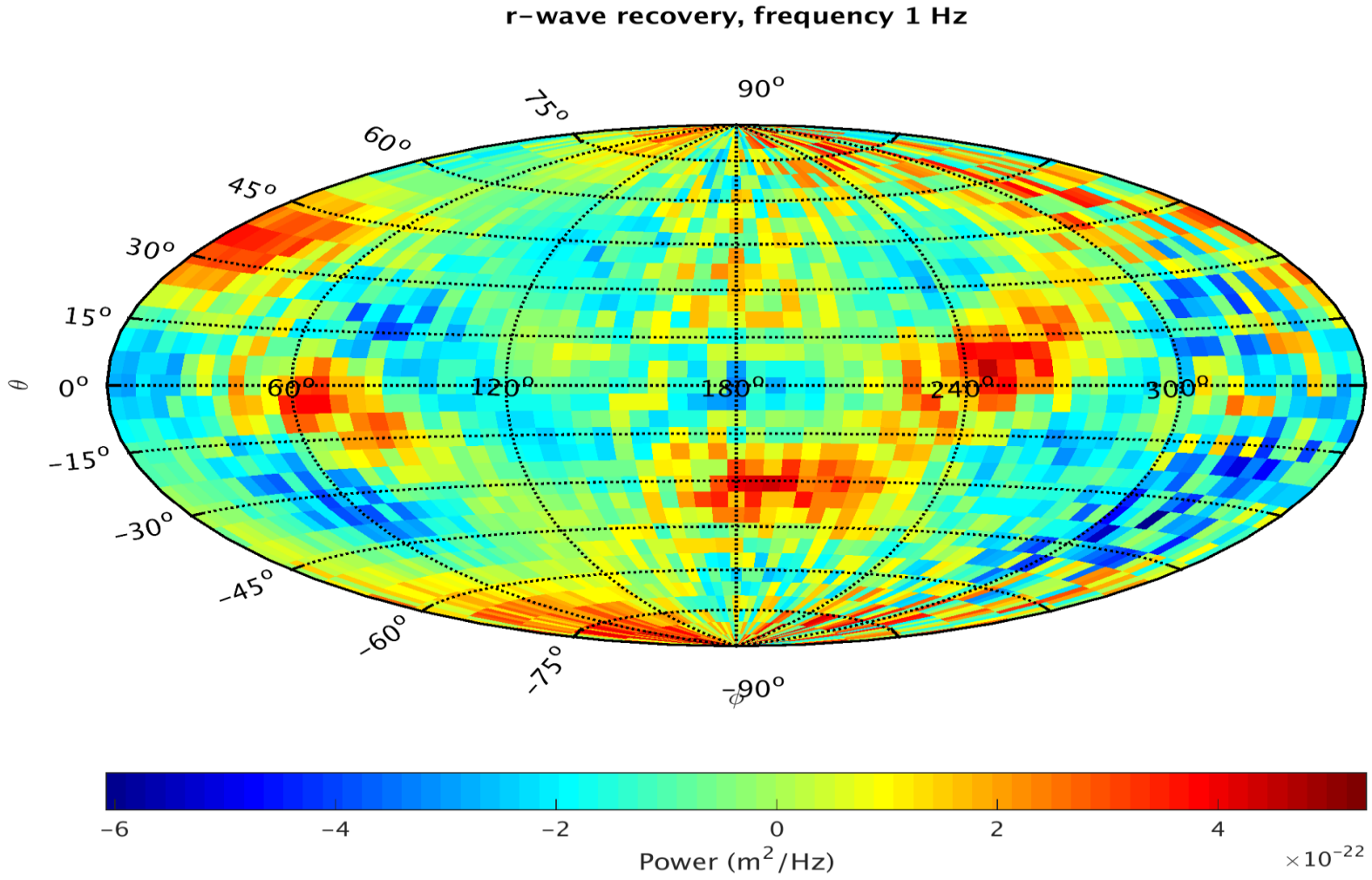
0°
−15°
−30°
−45°
−60°
−75°
−90°
θ
60°
120°
180°
240°
300°
φ
−8
−6
−4
−2
0
2
4
6
Power (m²/Hz)
×10⁻²²

$\epsilon = 1.9$


r-wave recovery, frequency 1 Hz
90°
75°
60°
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30°
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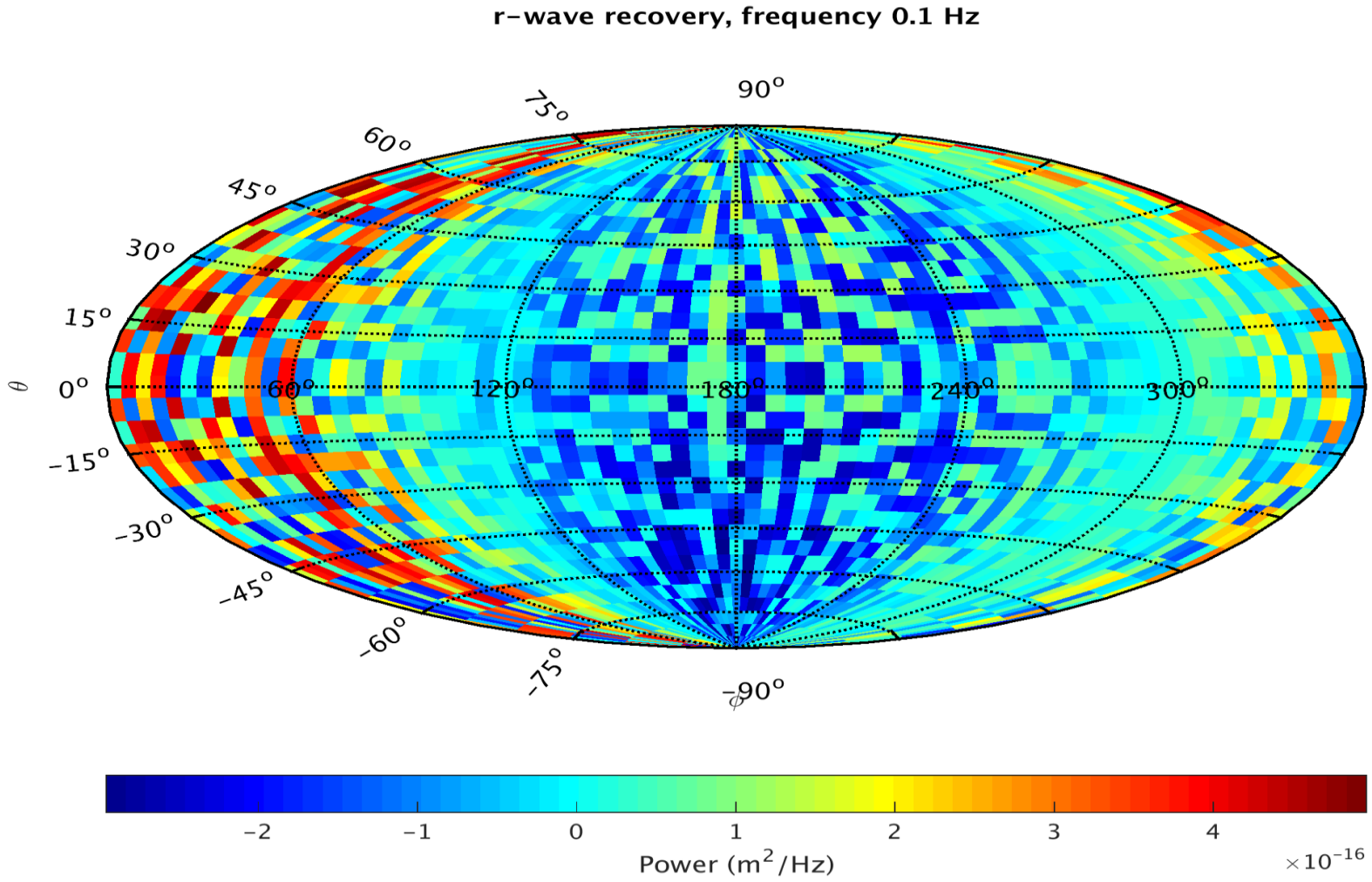
0°
−15°
−30°
−45°
−60°
−75°
−90°
θ
ϕ
60°
120°
180°
240°
300°
−6
−4
−2
0
2
4
Power (m²/Hz)
×10⁻²²

Recovery Frequency: 0.1 Hz

- v_R: 3,100 m/s
- α = 15,500 m
- Comments about recoveries:
  - “Junk” recoveries; i.e. no distinct signal was recovered—especially at low values of ϵ
  - Increasing ϵ seems not to have a great effect on the signal recovery; however, the power diminishes slightly (cf. slides 12 – 16)

$\epsilon = 0.1$


r−wave recovery, frequency 0.1 Hz
90°
75°
60°
45°
30°
15°
0°
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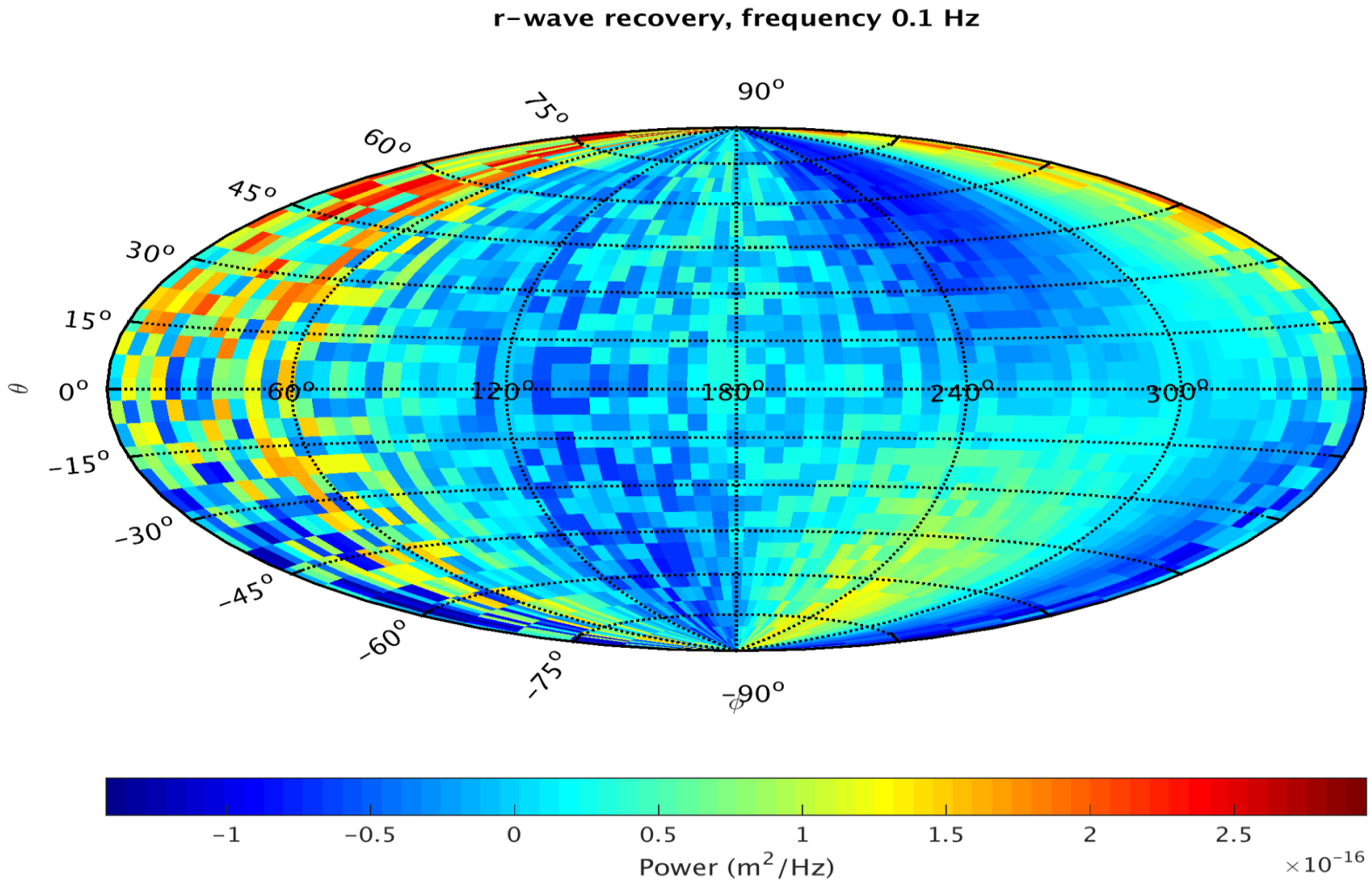
−30°
−45°
−60°
−75°
−90°
θ
60°
120°
180°
240°
300°
φ
−2
−1
0
1
2
3
4
Power (m²/Hz)
×10⁻¹⁶

$\epsilon = 0.4$


r-wave recovery, frequency 0.1 Hz
90°
75°
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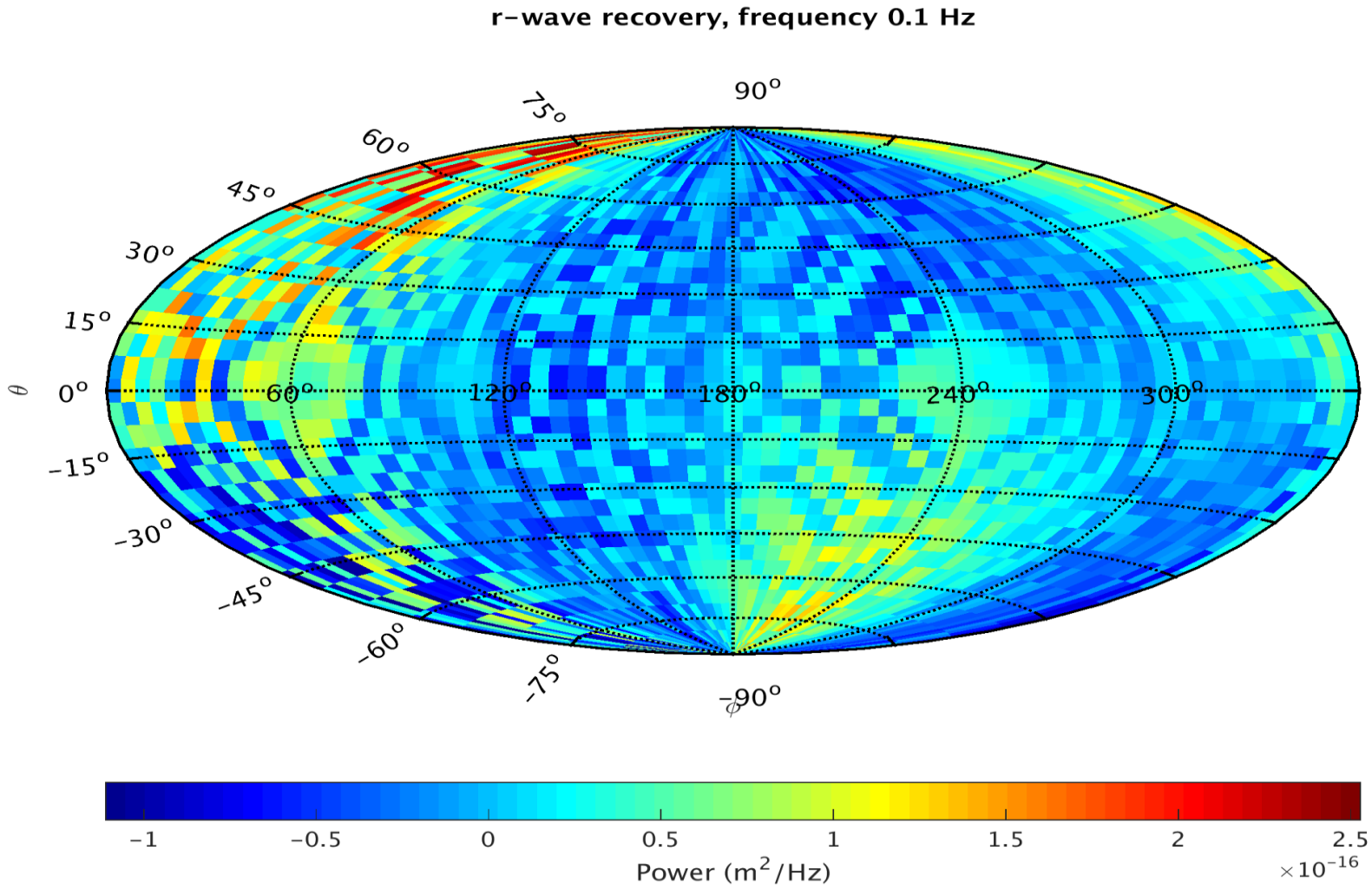
30°
15°
0°
-15°
-30°
-45°
-60°
-75°
-90°
θ
60°
120°
180°
240°
300°
ϕ
−1
−0.5
0
0.5
1
1.5
2
2.5
Power (m²/Hz)
×10⁻¹⁶

$\epsilon = 0.7$


r-wave recovery, frequency 0.1 Hz
90°
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−75°
−90°
θ
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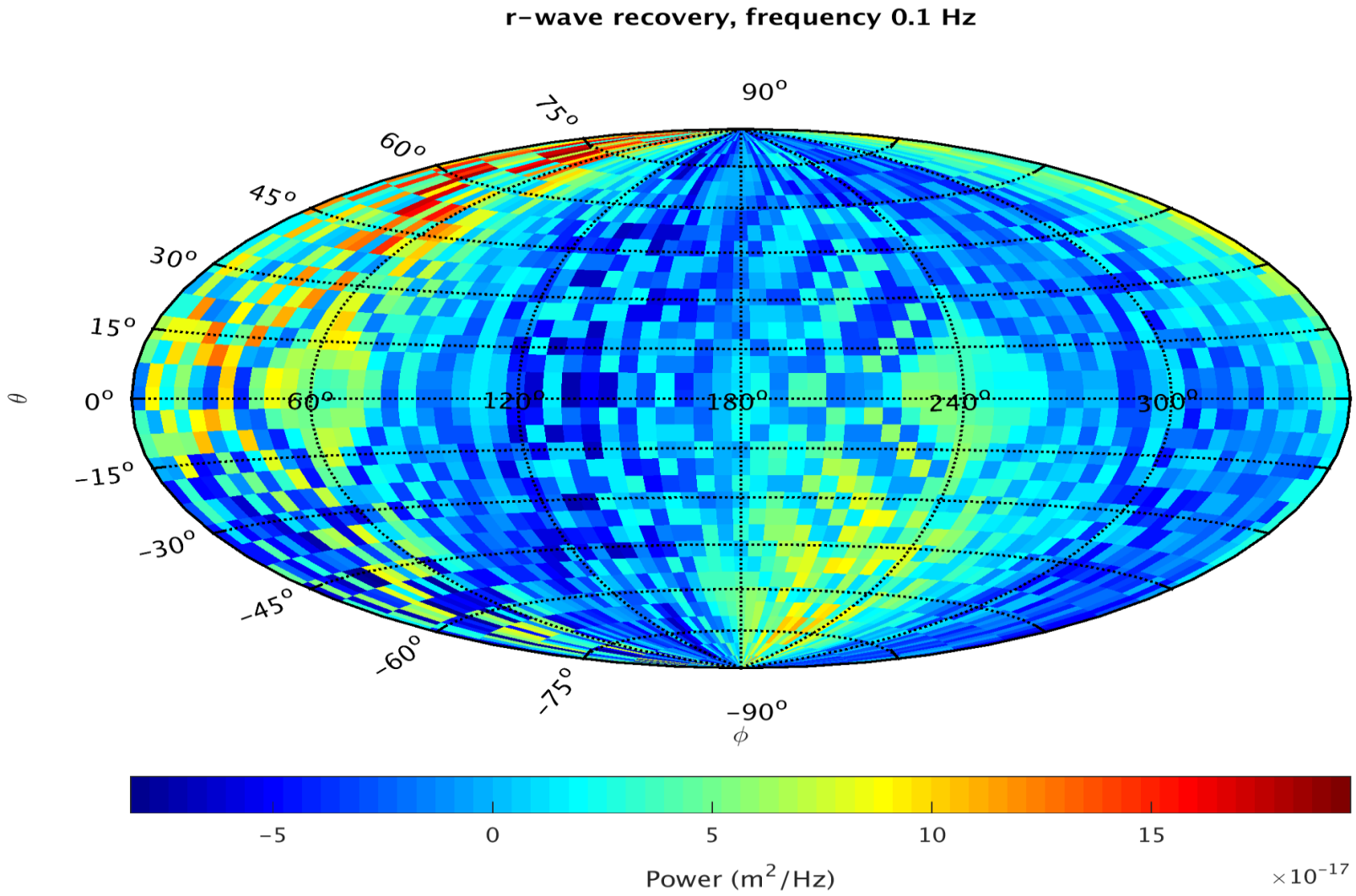
120°
180°
240°
300°
φ
−1
−0.5
0
0.5
1
1.5
2
2.5
Power (m²/Hz)
×10⁻¹⁶

$\epsilon = 1.0$


r-wave recovery, frequency 0.1 Hz
90°
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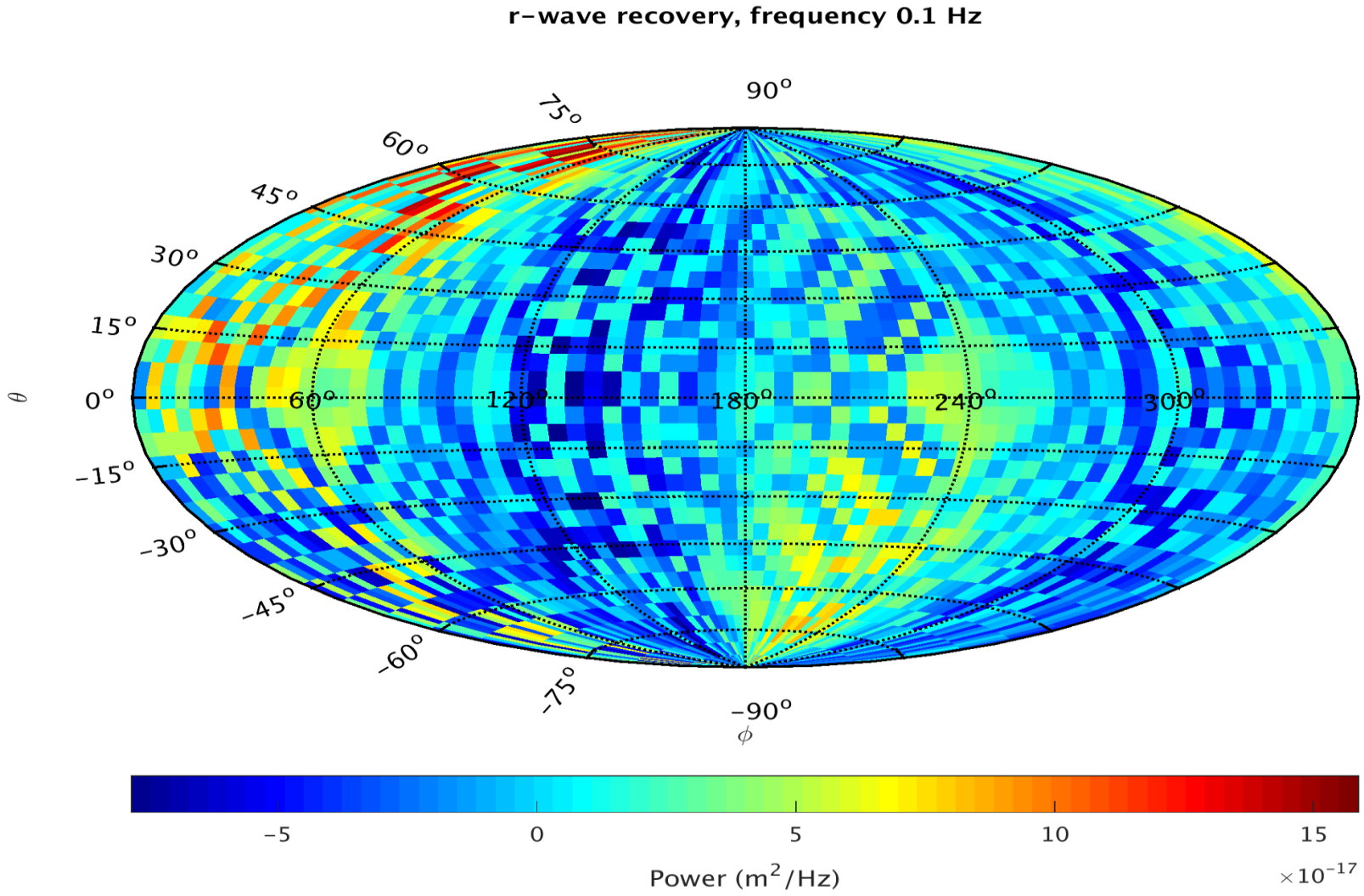
-15°
-30°
-45°
-60°
-75°
-90°
θ
60°
120°
180°
240°
300°
ϕ
−5
0
5
10
15
Power (m²/Hz)
×10⁻¹⁷

$\epsilon = 1.3$


r-wave recovery, frequency 0.1 Hz
90°
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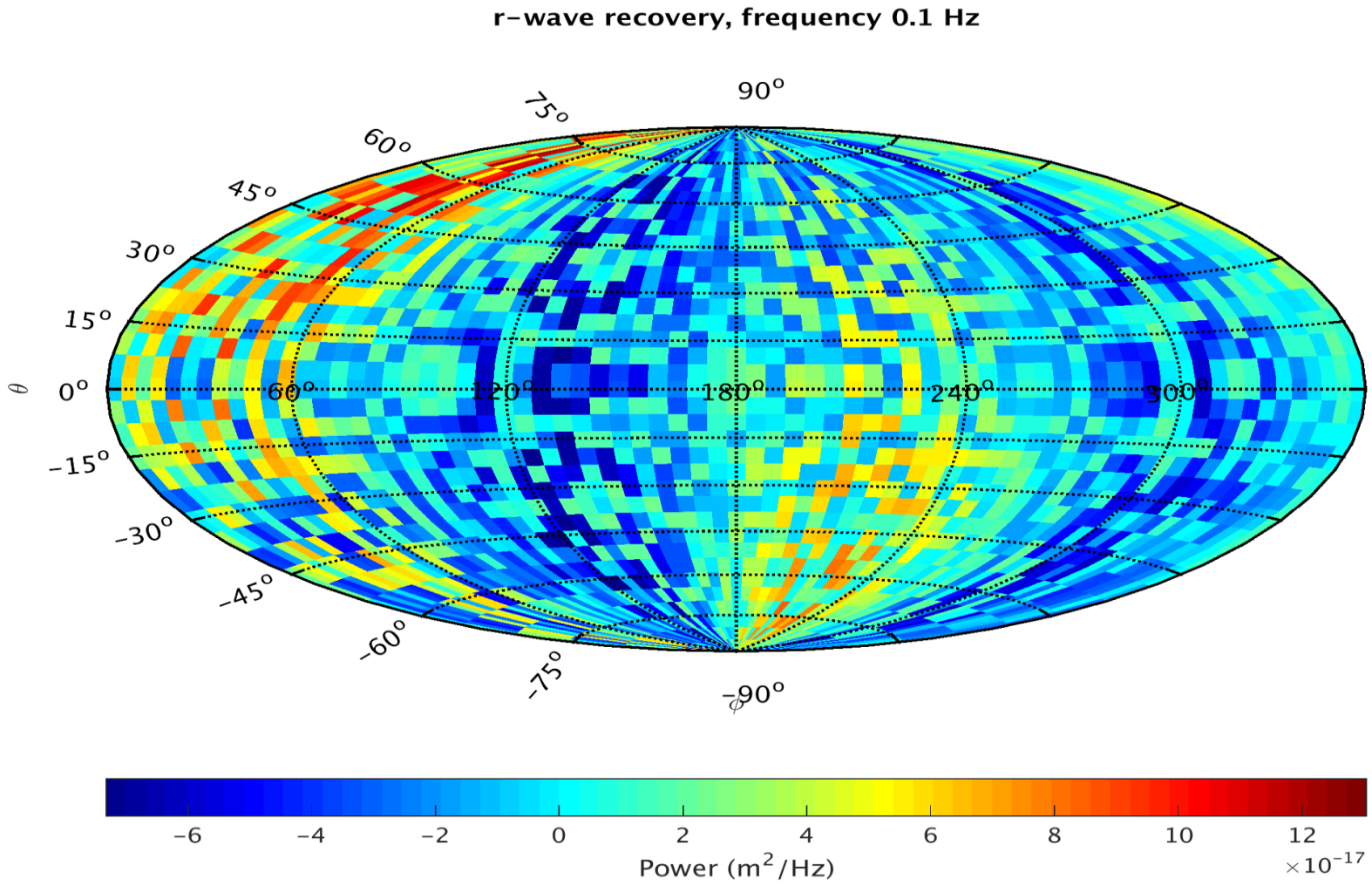
−30°
−45°
−60°
−75°
−90°
θ
ϕ
60°
120°
180°
240°
300°
−5
0
5
10
15
Power (m²/Hz)
×10⁻¹⁷

$\epsilon = 1.6$


r-wave recovery, frequency 0.1 Hz
90°
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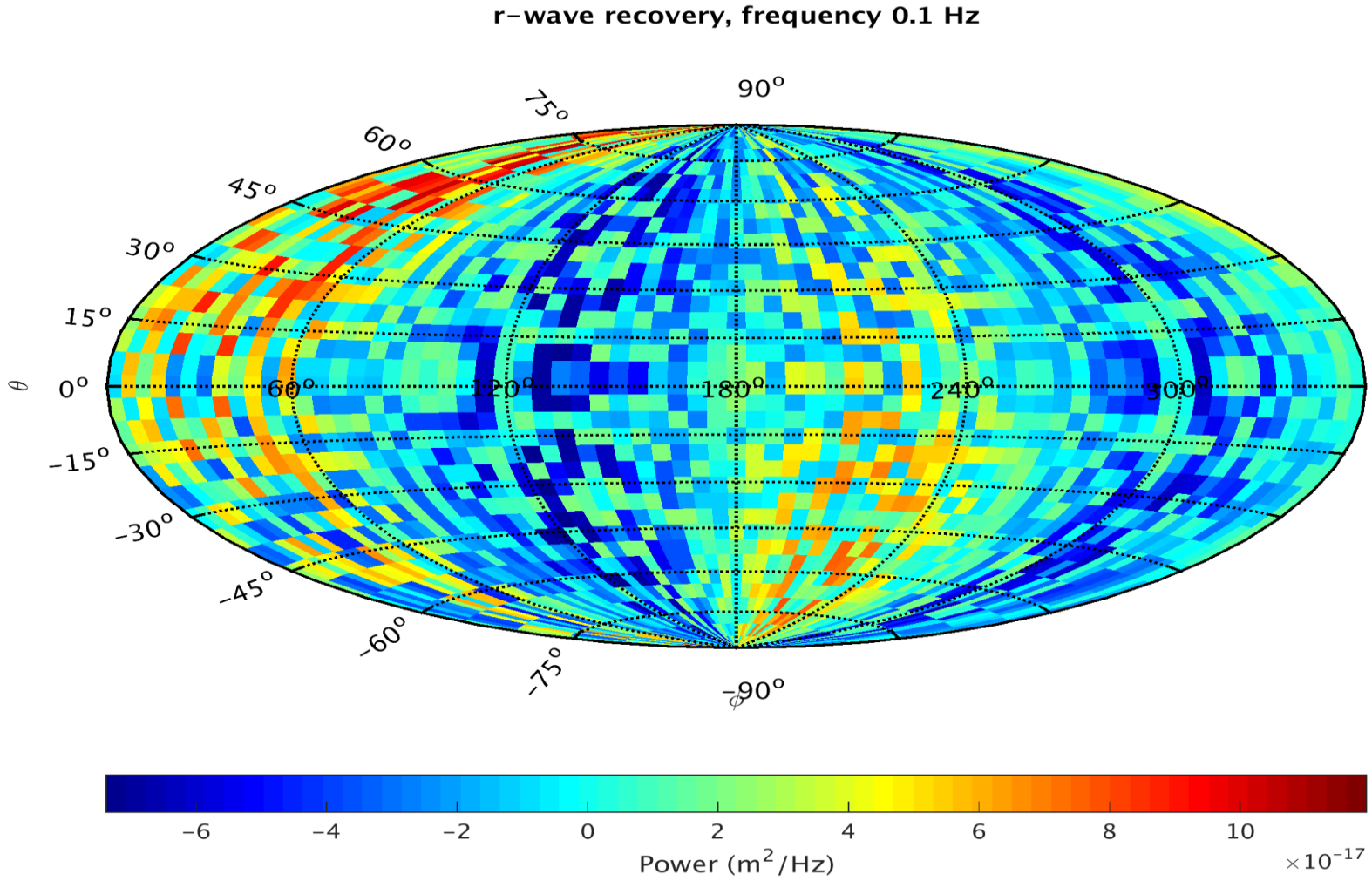
-30°
-45°
-60°
-75°
-90°
θ
ϕ
60°
120°
180°
240°
300°
−6
−4
−2
0
2
4
6
8
10
12
Power (m²/Hz)
×10⁻¹⁷

$\epsilon = 1.9$


r-wave recovery, frequency 0.1 Hz
90°
75°
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0°
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-30°
-45°
-60°
-75°
-90°
θ
ϕ
60°
120°
180°
240°
300°
−6
−4
−2
0
2
4
6
8
10
Power (m²/Hz)
×10⁻¹⁷