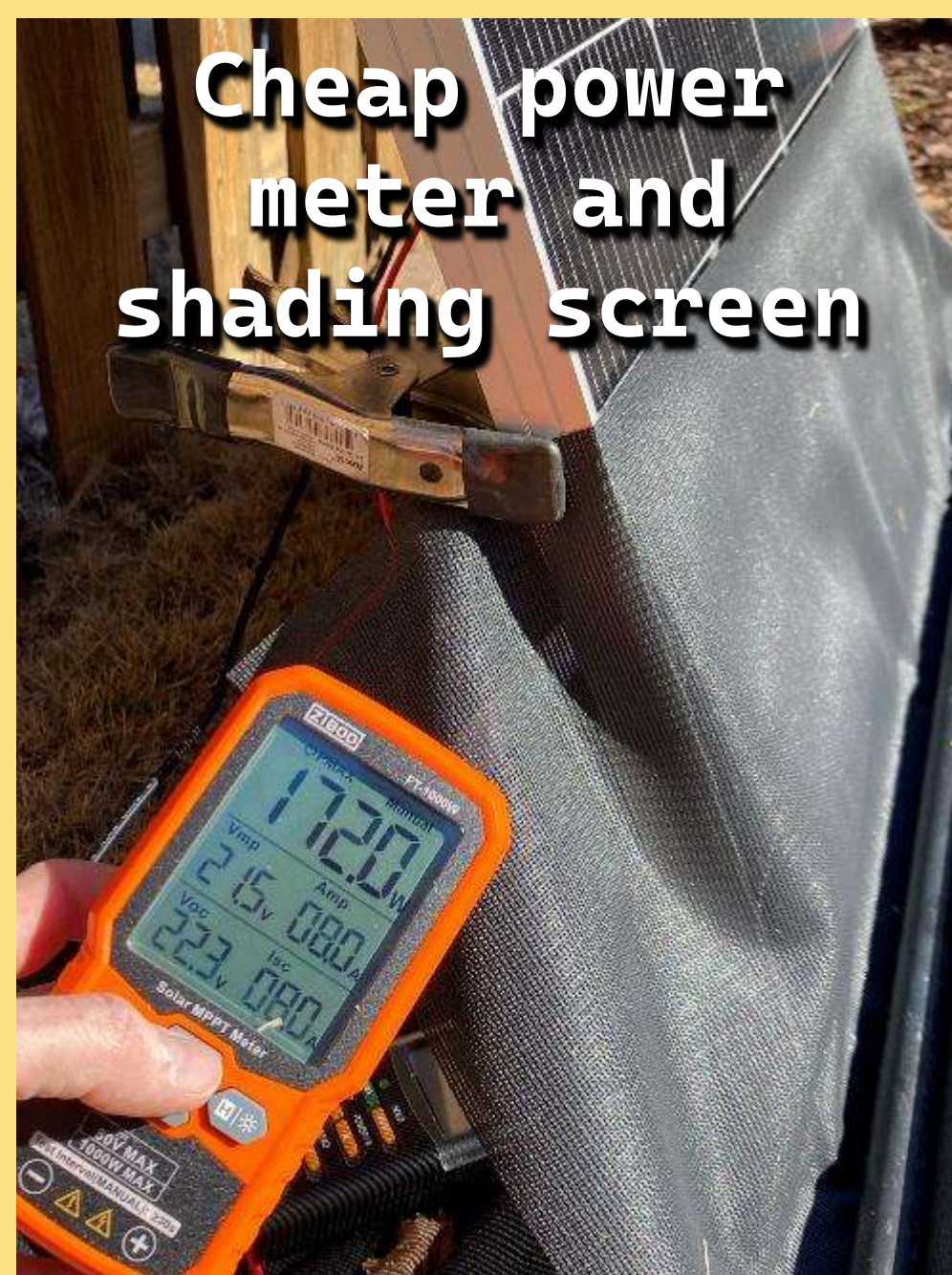


Backyard PV Module Partial Shade Loss Measurements

Will Hobbs &
Bentley Hobbs
The Hobbs Family
will.hobbs@gmail.com

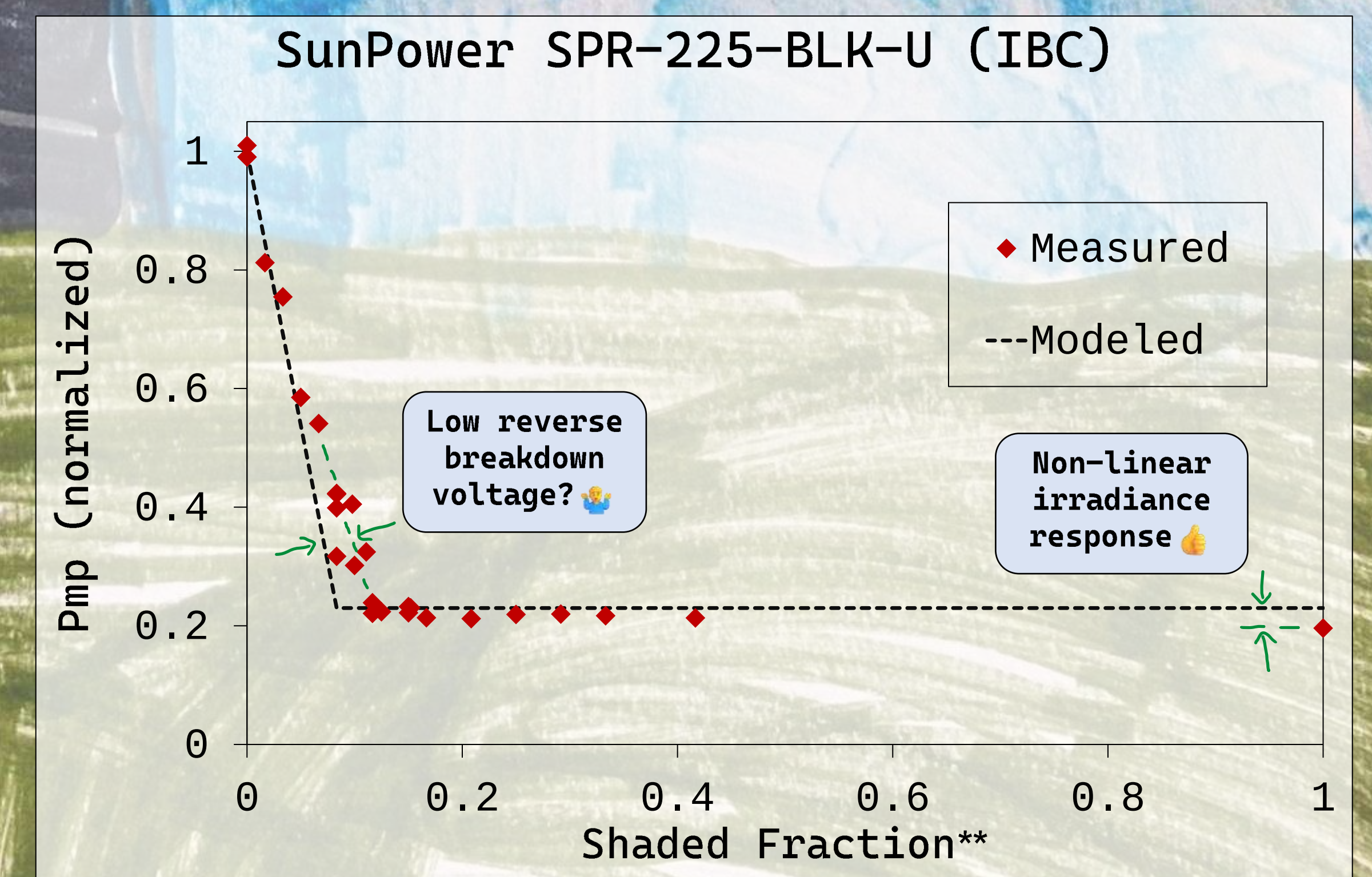
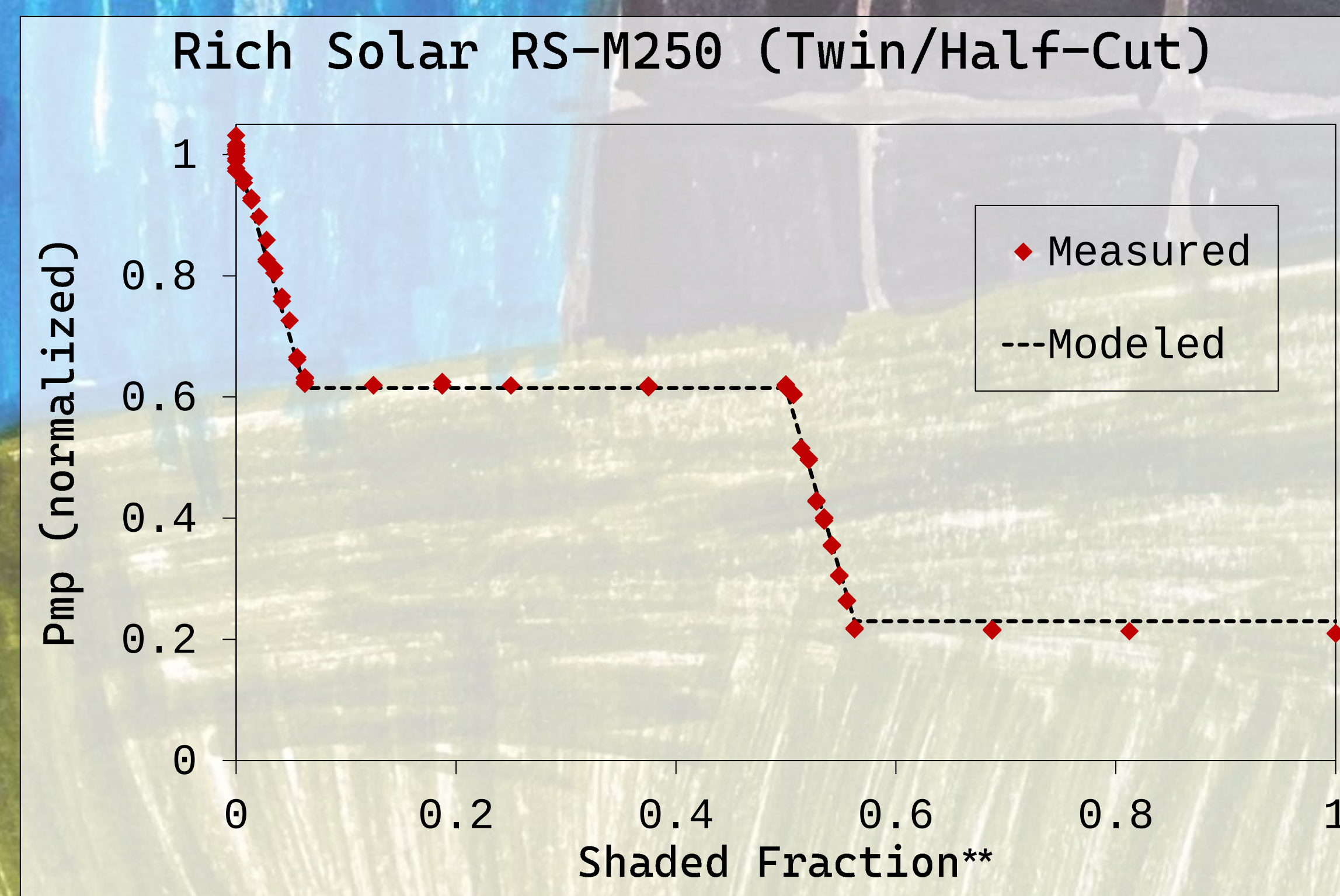
The community needs more partial shade data*.
It's easy to get, even in a cheap backyard lab.
Also, a simple model for losses is pretty good.



Methods:

- Simulate shade at ~20% diffuse fraction using window screen (~80% blocking)
- Measure P_{mp} at a range of shaded fractions, f_s
- Relatively stable irradiance
- Normalize to unshaded P_{mp} (and POA if it changes by $> 1-2\%$)
- Calculate shade loss
- Compare with modeled shade loss^{1,2}

Results:



*fraction of active area, not module length

Raw data available³, CC-BY-4.0!

*Why? Model validation, getting shade models like [1,2] in pvlib

Background illustration by Bentley

[1] Kevin Anderson, Maximizing Yield with Improved Single-Axis Backtracking on Cross-Axis Slopes
<https://docs.nlr.gov/docs/fy20osti/76023.pdf>
<https://doi.org/10.1109/PVSC45281.2020.9300438>

[2] W. Hobbs, K. Anderson, M. Mikofski, M. Ghiz, An approach to modeling linear and non-linear self-shading losses with pvlib. 2024 PVPWC.
github.com/williamhobbs/2024_pvpwc_self_shade

[3] github.com/williamhobbs/2026-pvpwc-backyard-shade