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# How pair pair formation in polar caps fills magnetosphere with plasma, heats NS surface, and generates radio emission.

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I report on the recent progress in understanding the physics of pair formation in pulsar polar caps. I discuss how much pair plasma can be produced in polar cap cascades and what it means for the physics of pulsar magnetospheres and PWNs. Relativistic particles accelerated in pair formation zones heat the NS surface, I demonstrate that the temperatures of pulsar polar caps predicted in the frame of modern non-stationary cascade models agree with observations quite well. I also present a novel robust mechanism for direct generation of coherent radio emission in pair discharges and discuss its properties.

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