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**Pulsars, Magnetars, and Jets-Problems and Lessons for Astrophysical Plasma Physics**

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Pulsars, magnetars and relativistic jets motivate investigations of plasma behavior well beyond the realms experimentally accessible in the laboratory or through in situ measurements in the heliosphere. Prominent among the areas of current research (the “known unknowns”) are the role of relativistic shock waves in converting ultrarelativistic flow energy into nonthermal particle spectra observed. I discuss aspects of what we know about this problem, along with where such acceleration physics is appropriate - essentially, to weakly magnetized flows. I also discuss the still less well understood strongly magnetized regime (magnetic energy density exceeding plasma rest energy density in the flow proper frame), where phenomenological models suggest that some form of magnetic dissipation, quite possibly mediated by current sheet formation, underlies the observed emissions. Such dissipation also appears to play a role to the conversion of strongly magnetized flows into weakly magnetized, shock dominated systems, a special case of the relativistic magnetic dissipation problem which I will also address.