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Coupling of Dungey and Vasyliūnas cycle reconnection: Drivers and observable consequences

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System-level models of reconnection cycles in rapidly rotating magnetospheres typically consider the Dungey and Vasyliūnas cycles in isolation and make specific predictions about the ion composition changes associated with these processes. However, in order to form and release a plasmoid as part of the Dungey cycle, reconnection must occur on closed field lines before any open flux is reconnected. This naturally leads to a coupling of these two cycles. In this presentation we conceptually explore the observable consequences of this coupling in terms of time-dependence in the ion composition of reconnection flows as reconnection proceeds through the closed and then open magnetic flux. We argue that in the absence of any solar wind driving the Vasyliūnas cycle can in principle proceed in isolation, but the same is not true of the Dungey cycle as long as there is significant mass-loading in a rapidly rotating magnetosphere. We also explore the driving of these cycles using quantitative models of the magnetotail which include the effects of the centrifugal force. The onset of reconnection in the magnetotail depends on a thinning of the current sheet that might arise due to i) stretching of field lines due to the centrifugal force, ii) compression of the plasma sheet by the addition of open flux to the lobes or the passage of a solar wind compression, or iii) a combination of these effects. We consider the stability of the magnetotail to examine whether triggering of tail reconnection due to solar wind compression requires a particular mass content of the magnetotail.