

Further details can be found in my book *Much Ado About (Practically) Nothing: A History of the Noble Gases* (2010). I apologize to the many planetary scientists whose early work is not mentioned here due to lack of space and my own limitations.

References

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Reconnecting reconnection with its current roots

The review by Jack Zirker and Oddbjørn Engvold (PHYSICS TODAY, August 2017, page 36) of recent coronal research makes extensive use of the concept of field lines—in particular, magnetic reconnection. But like the analogous streamlines in fluids, magnetic field lines are not physical entities. They are just a convenient way of visualizing the structure and behavior of magnetic fields. To convince yourself of this, think of the familiar pattern of field lines connecting the poles of a bar magnet. How many lines are there?

It follows that field-line reconnection itself is not a physical phenomenon and cannot cause either coronal heating or the propulsion of plasma in coronal mass ejection events. Such coronal phenomena result from dynamical processes involving electromagnetic fields, currents, and pressures, which are physical. Reconnection merely describes the way the magnetic field topology changes.

As mentioned in the article, reconnection events are associated with thin current sheets, which are related to the magnetic field by Ampere's law. Their evolution is fundamental to understanding coronal phenomena. Eric Priest and Terry Forbes (Zirker and Engvold's reference 3) note that James Dungey, the

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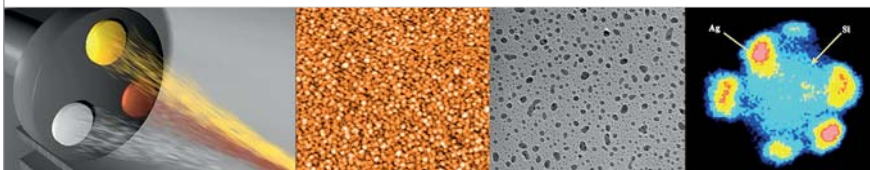
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originator of the reconnection model, “found that small perturbations in the vicinity of the null point lead to the explosive formation of a current sheet. Near the null point, plasma motions induced by a small current perturbation cause the current to grow, and this current further enhances the plasma motions resulting in a positive feedback.”¹ Focusing on the role that the currents play in reconnection would make for a clearer understanding.

Reference

1. E. Priest, T. Forbes, *Magnetic Reconnection: MHD Theory and Applications*, Cambridge U. Press (2000), p. 8.

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Another side to scientist burnout

In his articulate Commentary (PHYSICS TODAY, September 2017, page 10), Luigi Delle Site asks that we try to help colleagues who are experiencing burn-

out. However, the cases he describes—faculty who can no longer teach the simplest class or participate in a seminar—seem beyond the help of all but experienced mental health professionals.

Universities are not orphanages, retirement homes, or mental health institutes. In reality, most universities have a great deal of work that has to be done. If employees who appear to have severe mental health issues continue to occupy their posts, someone else will have to do their work and will probably not be paid extra for doing so.

For every professor getting full salary for an inadequate performance, dozens or hundreds of candidates are eager to replace him or her and do a good job. Moreover, we professors have many stress breakers that are not available to other professions: We have sabbaticals to recharge our batteries and get new ideas, and we can give up research for a few years to write a good textbook or take on more administrative duties as an assistant dean, admissions director, or similar position.

Driving a London bus or taxi is far more stressful than being a physics

professor. Being a physicist is not exactly like being a professional athlete who usually faces unemployment by age 35, but neither is it intended to be a lifetime entitlement with a salary every month regardless of performance. Hospitals don't retain medical staff who can no longer perform their duties, and taxicab companies don't continue to pay mentally impaired drivers. Why should professors be treated differently from plumbers, medical staff, factory workers, or taxi drivers? Some universities would put such staff members as Delle Site describes on involuntary medical leave.

Careers are neither the only goal in life nor the primary one. Perhaps putting time into activities with friends and family, developing a serious hobby, participating in community or church activities, or simply helping others could avoid burnout. One who spends more time helping others will be less prone to cynical disappointment.

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