Observations on theory papers in *Nature*

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Results of particular interest to me

Gabuzda's observations point to jets being electromagnetic structures

- A promising link between observations and theory, in a field where observers too often focus on morphology, and theorists on aspects that are inherently untestable

DeLaney's observations of pulsars, and Del Zanna's model

- Moving optical and/or x-ray features, combined with more comprehensive models, should lead to new understanding

SGR 1806-20

- QPOs in tail is a highlight
- Do flairs provide part of the population of short bursts?
- What is its distance?

GRBs

- Piran is skeptical about the Amati relation: more redshifts are needed
- Toma's unified model is conceptually interesting, but why no optical/radio from any short bursts?
- Nakar's proposal for determining baryon flows or Poynting flux is fascinating to me, but analysis of 'reverse shock' in PF model necessary as pointed out by Blandford

UHECRs: one the biggest mysteries of modern astrophysics

- Where do they come from?
- How are they accelerated?

- Great expectations for Auger!

Theory and *Nature*

Background

- >20 yrs ago *Nature* used to publish 'wonky' theory papers
- ~20 yrs ago a decision was made to emphasize observational results
- theory papers published now are criticized as being 'lightweight'

Length limit said to constrain papers to being lightweight

- With the advent of online Supplementary Information – on which there is no effective limit – length is no longer an issue

- But theory referees tend to be ‘soft’, allowing authors to get away with weak arguments

Fred Hoyle once said that if a theorist is right more than five percent of the time, he isn't trying hard enough

This poses a problem for *Nature*

- Only a tiny fraction of our readers are ever in a position to judge critically the technical merits of any particular paper, so we try – as much as possible – to place before them only that work that experts say is robust, reasonably compelling and likely to be right

If a paper is just putting forward an idea for discussion, why publish it in *Nature*?

- Astro-ph is a better venue for such papers

What does *Nature* look for in a theory paper?

- Authors must be prepared to defend the position that their paper provides the right (or at least best available) explanation
- They should also make a prediction that could be used to refute the model within the next few years

Usually it is much harder to assess whether a theory paper is likely to be correct

- A successful paper will at least stimulate a lot of new activity, and if it takes several years to be shown wrong then that's the way science works
- A paper rapidly shown to be wrong in a trivial way is the fault of the referees

Theory referees tend to be "soft" compared to observers

- Many people don't understand that *Nature* is not the ApJ
- Some theory referees provide very brief reports, with no justification for statements
- This is unhelpful to editors, and exceedingly unfair to authors

Why does *Nature* take this position?

- Chris Benn (2001PASP..113..385B) noted that in the mid-80's *Nature* published ~2% of most-cited papers in astronomy, but by 2000 we published ~20%
- We won't mess with success!

Posting to astro-ph is **always** allowed by *Nature*!

- There is a myth that we don't allow posting – please don't propagate that myth!!
- NASA is trying block posting to keep control of publicity– don't confuse NASA and *Nature*

We need help from tough and critical theorists

- Papers should be important – in the top few on the topic for the last year or so
- They should be as rigorous as a full ApJ paper, using online Supplementary Information if necessary
- They must correspond to conditions in the real Universe – simple explorations of parameter space are not wanted