Commas are the most viciously fought-over punctuation marks among copy editors. But for one use, they are absolutely essential to avoid misunderstanding in scientific writing. We’ll look at that case today.
Always set off an introductory phrase with a comma

_During the first tens of seconds after the supernova explosion_, the newly formed protoneutron star has a radius of about 50 km.

_In an electronic circuit_, diodes conduct current in only one direction.

_Different from nonreciprocity due to the nonlinear acoustic effect and broken time reversal symmetry_, this new model leads to...

_If the system started out in one well_, it would be trapped there until the height-to-base ratio...

The comma makes clear what the subject of the sentence is.

Introductory phrases are often used in science writing to set the action of the sentence in time (Example 1) or place (Example 2).

They are sometimes used to call a reader’s attention to differences (Example 3) or to set up a speculation (Example 4).

Some editors say that an introductory comma should be used if a prepositional phase containing two or more prepositions introduces the sentence, but the comma is not required if the sentence begins with a phrase containing only one preposition.

“Once upon a time _in a galaxy far away_, Luke Skywalker battled an evil empire.”

“In certain cases the transition did not occur.”

Ms. Particular thinks such editors are _wrong_. In the “transition” example, the sentence is easier to process for the reader, and the key point is much more identifiable, if a comma is used after “cases.” Try reading Example 2 without the comma. Did you read “electronic circuit diodes” and then stumble at “conduct”?

The “due to” in Example 3 will be dealt with later.

Example 3: http://prl.aps.org/abstract/PRL/v106/i8/e084301
Example 4: http://focus.aps.org/story/v27/st7
Here’s an example that shows what the loss of an introductory comma does to meaning:

“For bulk \( n \) alkanes in contact with sapphire only surface parallel molecules were observed at the interface and...” PRL 106, 137801 (2011).

Were the alkanes in contact with sapphire only, or were only surface parallel molecules observed?

Only the authors know...

In the original text, the line break comes after the “only,” as it does in this example, which further complicates divining the authors’ intended meaning of this sentence.

The example sentence is also missing another comma before the and, but that’s a rant for another day.