
MMS
Magnetospheric
Multiscale Mission

1
00:00:00,799 --> 00:00:04,840
So to illustrate the importance of
these fields to the process of

2
00:00:04,840 --> 00:00:08,170
reconnection, we have a
simplified lab distribution

3
00:00:08,170 --> 00:00:11,150
here, lab demonstration, that we
would like to show you.

4
00:00:11,150 --> 00:00:14,820
now, the equations that cover
the magnet field is called

5
00:00:14,820 --> 00:00:22,950
Maxwells equations.

6
00:00:22,950 --> 00:00:24,859
we'll talk about that.

7
00:00:24,859 --> 00:00:27,539
what we're going to see in this
wire is I'm going to pass a

8
00:00:27,539 --> 00:00:29,470
current down this wire.

9
00:00:29,470 --> 00:00:32,320
this will happen in a minute.

10
00:00:32,320 --> 00:00:35,840
when I do that, there will start
to be a dissipation in this

11
00:00:35,840 --> 00:00:36,840
wire.

12
00:00:36,840 --> 00:00:40,980
what that tells us is, in fact,
the current sets up a magnet

13
00:00:40,980 --> 00:00:47,879
field in this wire and the
electro magnet wire flows the

14
00:00:47,879 --> 00:00:50,740
energy into this wire to cause
dissipation.

15
00:00:50,740 --> 00:00:53,640
I can start to smell the wire
and soon you'll start to see it

16
00:00:53,640 --> 00:00:54,989
heat.

17
00:00:54,989 --> 00:00:55,989
that's what we're doing.

18
00:00:55,989 --> 00:00:59,280
we're converting magnet fuel
energy into electrical energy or

19
00:00:59,280 --> 00:01:00,680
heat.

20
00:01:00,680 --> 00:01:05,620
now, it's the case that if I
crank up the current large

21
00:01:05,620 --> 00:01:10,860
enough in this particular
demonstration, soon you'll start

22
00:01:10,860 --> 00:01:14,540
to see the effects of this and

then very soon we will have an

23
00:01:14,540 --> 00:01:18,150
explosion that's very much like
reconnection.

24
00:01:18,150 --> 00:01:21,270
we released in this case the
energy of the tension in this

25
00:01:21,270 --> 00:01:26,630
wire, but you saw that hot spot
where we have concentrated

26
00:01:26,630 --> 00:01:30,550
spaces and that's what we're
looking for in MMS.

27
00:01:30,550 --> 00:01:36,710
we can't see them because it's a
rare five plasma and that's the

28
00:01:36,710 --> 00:01:42,280
major difference between this
demonstration and the case of

29
00:01:42,280 --> 00:01:44,590
looking for reconnection in
plasmas.

30
00:01:44,590 --> 00:01:48,460
quite a bit of difference in the
sense that in this wire I

31
00:01:48,460 --> 00:01:53,990
understand what happens, why
this wire heats up and causes

32
00:01:53,990 --> 00:01:54,990
dissipation.

33
00:01:54,990 --> 00:01:58,620
as it gets hotter, since the
wire is under tension, it spins.

34
00:01:58,620 --> 00:02:01,310
the resistance goes up, but the
current has stayed the same

35
00:02:01,310 --> 00:02:04,040
because I adjusted the power
supply that way.

36
00:02:04,040 --> 00:02:07,340
what happens eventually is all
the dissipation goes into a very

37
00:02:07,340 --> 00:02:10,560
small region, and then it
separates the wire.

38
00:02:10,560 --> 00:02:14,240
MMS is investigating
reconnection because we do not