Chandra X-ray Center

What does this warning mean?

```
WARNING: upper projection bound not found for (parameter name)
```

When this message occurs, it is because the `projection` method went right up to the "hard maximum" at some point in its attempt to find the upper limit of the projected error region for that parameter. (The "soft maximum" can be set by the user to be a value the parameter should not exceed during fitting; the "hard maximum" is the value the parameter is never allowed to exceed – the user cannot change the hard maximum. The soft maximum must always be less than or equal to the hard maximum.)

Usually, reaching the condition that triggers this message also means that the `projection` function stops trying to determine the upper limit. However, it is possible for the `projection` function to keep trying to find the upper limit. Basically, the function is in a loop where it keeps trying to step away from the best−fit parameter by varying amounts; this allows the function to map out the shape of parameter space around the best−fit parameter value.

It can happen then that the function went up to the hard maximum but, in another iteration of the loop, the function stepped away by a different amount and did settle on a more sensible upper limit.

If the function encounters this rare case, it will print the warning, but still report an upper bound for the uncertainty interval for that parameter. In this case, the upper bound reported *is accurate*. If the hard maximum is reached and the loop exits, no upper bound would be reported.

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