Creep Noise

- The relevant formula is given below including some parameters. The parameters are all upper limits so that the final number given is an upper limit.
- Both the creep glitch size and glitch rate were set from an experiment where C85 steel was loaded to a few percent below its breaking point. Since LIGO is well below this limit (although the exact steel type is unknown), these numbers are probably much too large.
- In any case, creep does not seem to be an issue, although the slope is $1/f^3$

$$x(f) = \Theta \left( \frac{f_0}{f} \right)^2 q_s \frac{\sqrt{\lambda}}{2\pi f}$$

$\Theta =$ vertical to horizontal coupling $[10^{-3}]$

$f_0 =$ vertical resonance $[13 \text{ Hz}]$

$q_s =$ creep glitch size $[10^{-15} \text{ m}]$

$\lambda =$ creep glitch rate $[2 \times 10^5 \text{ s}^{-1}]$

$x(100 \text{ Hz}) = 1 \times 10^{-20} \text{ m} / \sqrt{\text{Hz}}$