

Supplementary Information

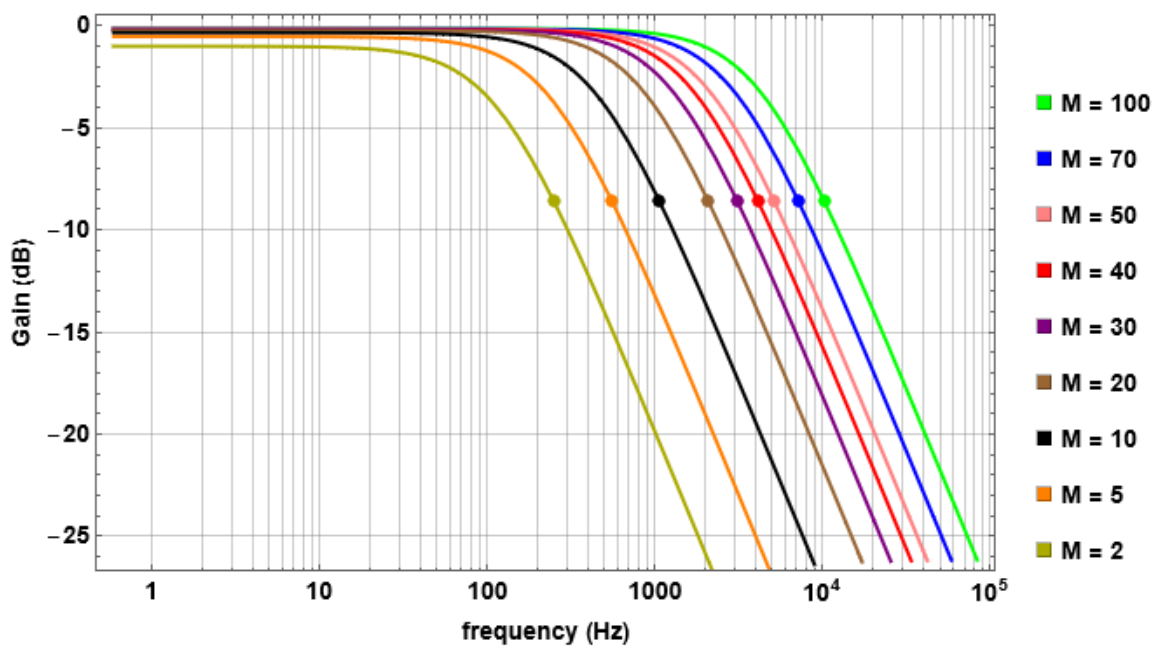
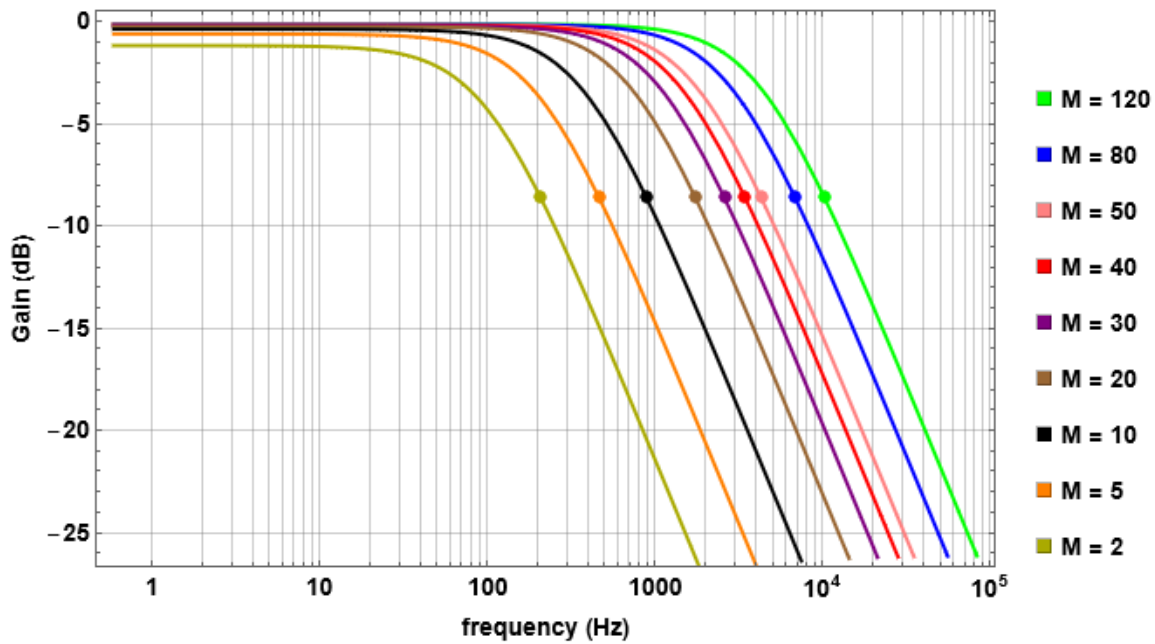
Filtering property of myelinated internode can change neural information representability and might trigger a compensatory action during demyelination

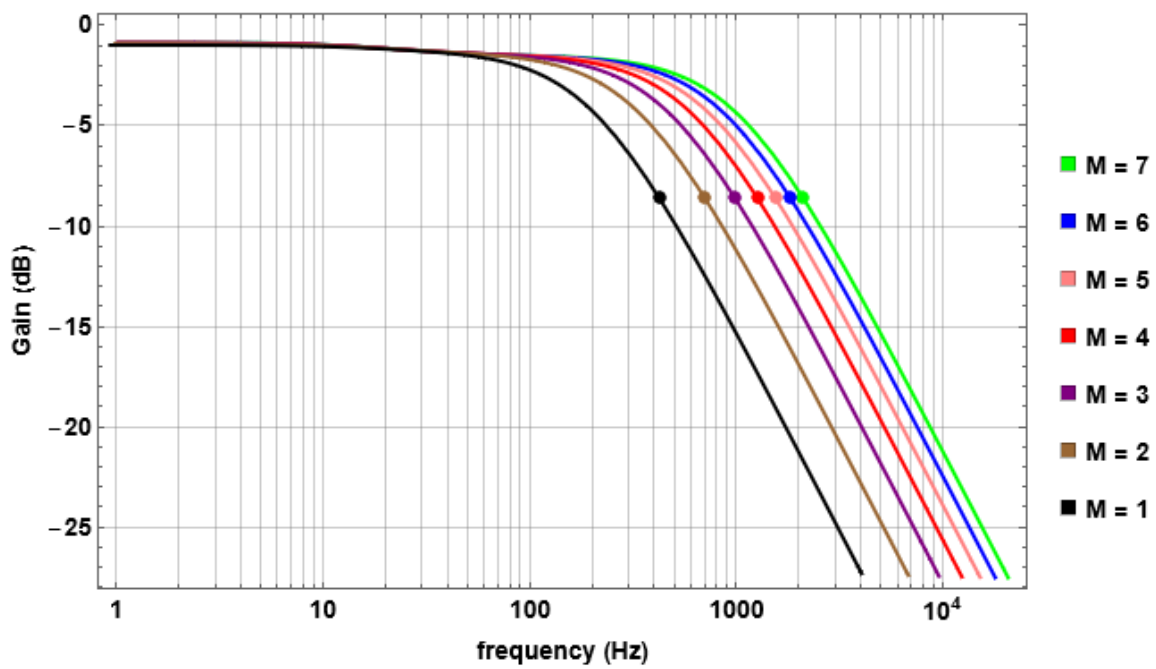
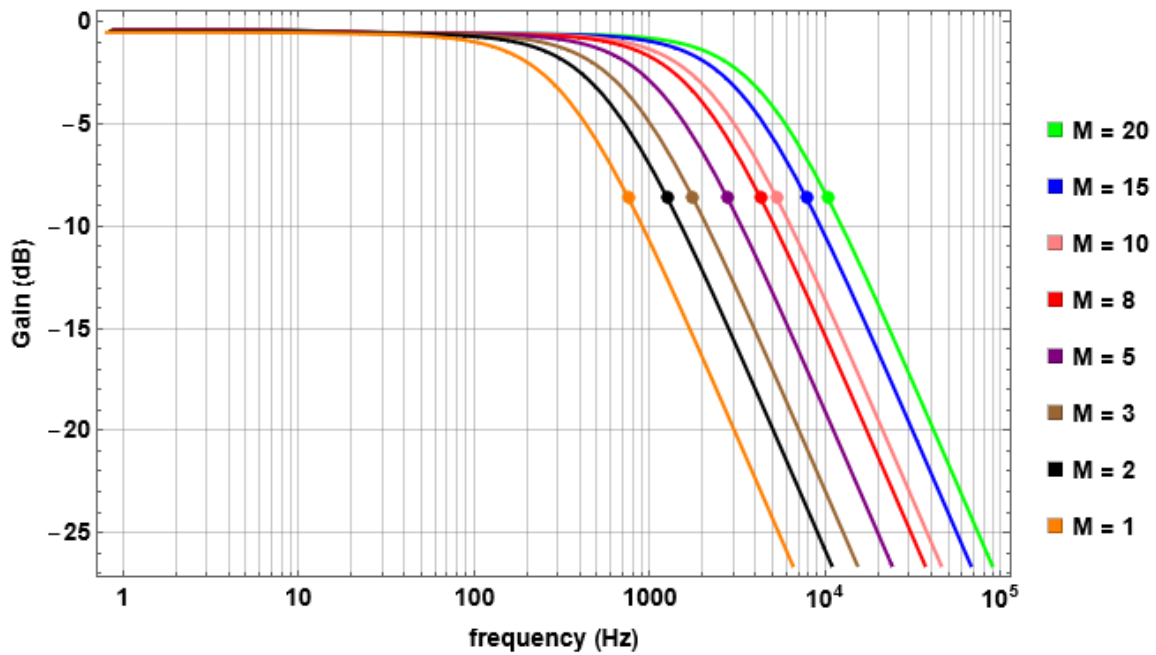
Sarbani Das and Koushik Maharatna

School of Electronics and Computer Science, University of Southampton, University Road,
Southampton, SO17 1BJ, United Kingdom

Corresponding author: Koushik Maharatna

Email: km3@ecs.soton.ac.uk





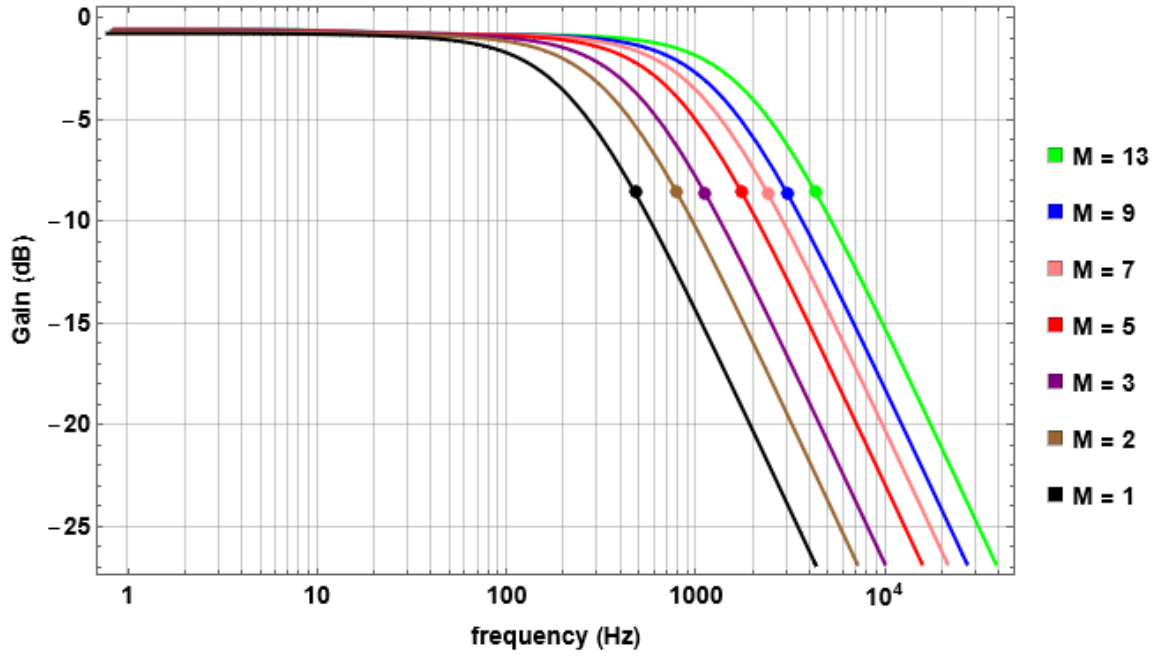


Fig. S1. Bode plot for the fibers (from the top to bottom) $A\alpha12$, $A\beta11$, $A\beta12$, $A\delta11$, $A\delta12$, CC and CB. Solid circles denote f_L for corresponding to the different myelin turns. All the fibres show the same characteristics – as M reduces, f_L moves toward the lower frequency bands and vice-versa.

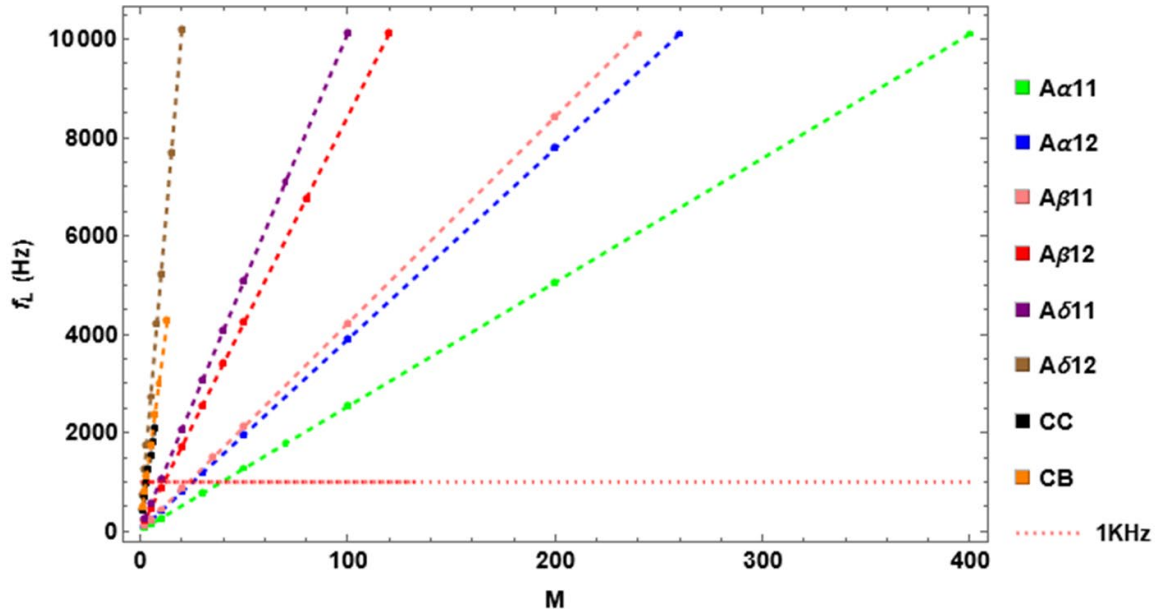


Fig. S2. The loci of f_L with change of myelin turns for the fibers considered in this work. The red dotted line represents $f_L = 1$ KHz limit. The rate of change of f_L appears to be much steeper for the fibres with smaller r and L indicating dependence on these parameters too.

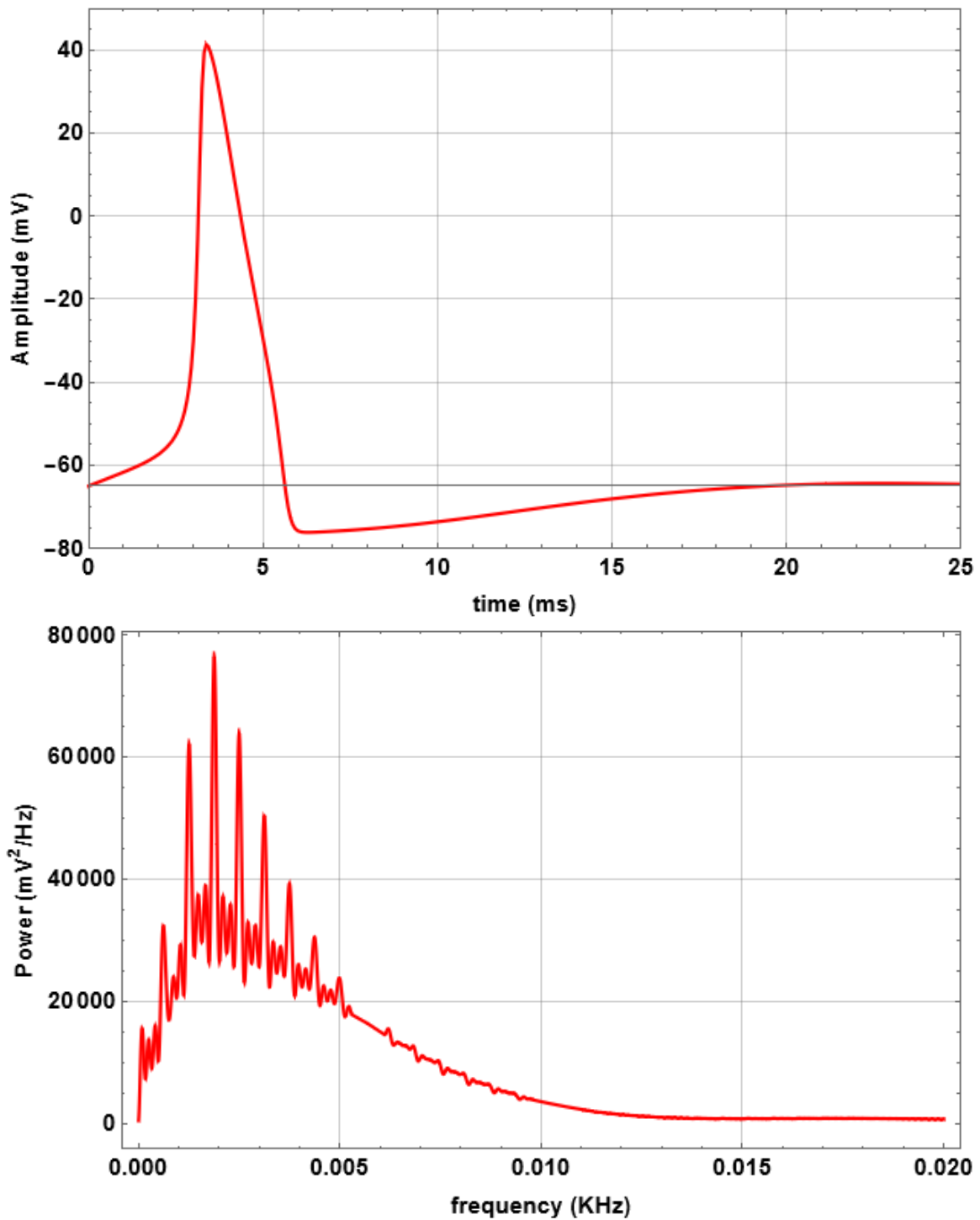


Fig. S3. Spectral property of an AP. Top figure shows AP generated using the classical Hodgkin-Huxley model and bottom figure shows the Power Spectral Density (PSD) of the AP. PSD was calculated by first taking Fourier Transform of the AP and then squaring the amplitudes of the individual Fourier components.

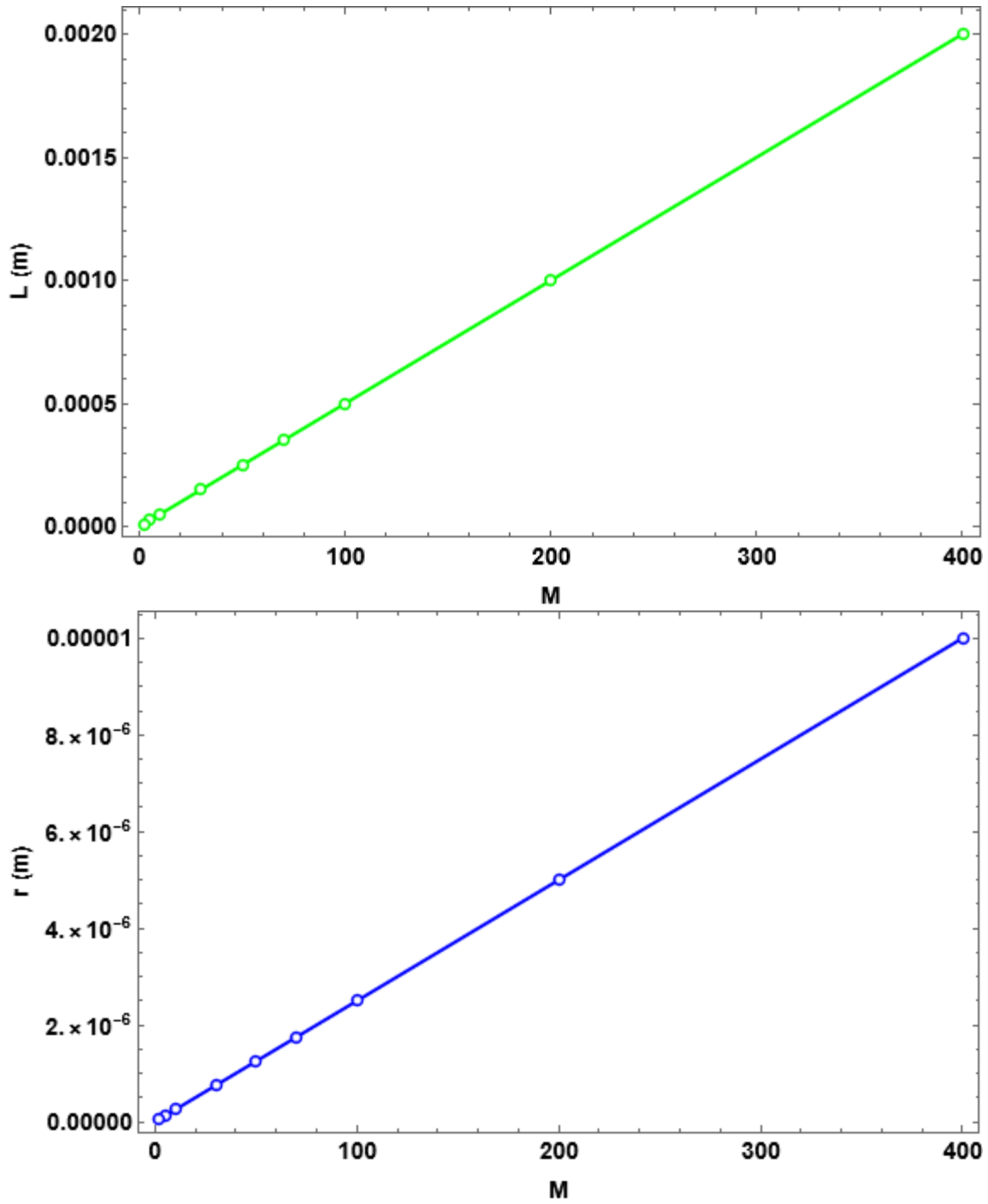


Fig. S4. The compensatory scenario for $A\alpha 11$ fibre – top and bottom figures show the trend of reduction of L and r with reduction of M required to maintain $f_L = 10$ KHz. Note the difference of scales between their trends.

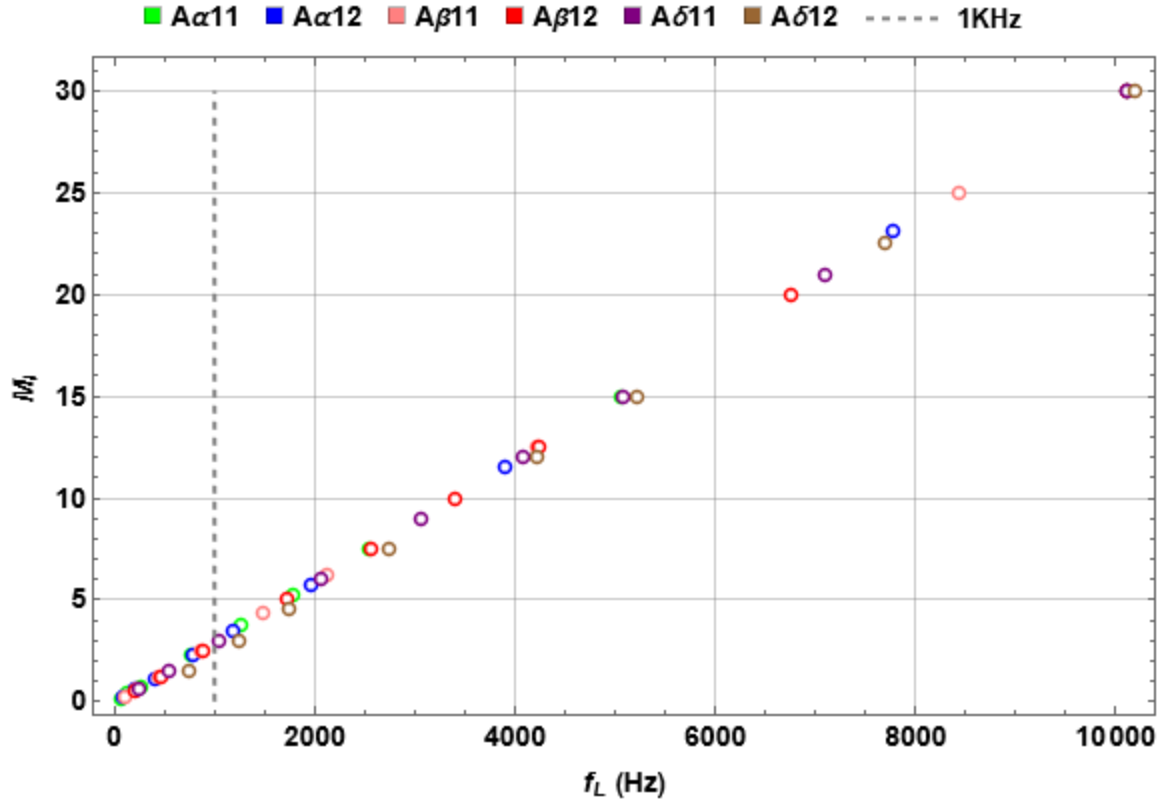


Fig. S5. The limiting condition for compensation in PNS fibers. Below $M_l = 30$ no more compensation is possible to maintain $f_L = 10$ KHz for any of the PNS fibers – note that for all the PNS fibers M_l is overlapped. On the other hand, all PNS fibers can do compensation for $f_L = 1$ KHz (shown as the dotted line) until $M_l = 3$.