CLAIMS

1. A shaped tube for use as a component in the fabrication of an antiresonant hollow core optical fibre, the shaped tube having a side wall with a transverse cross-sectional shape comprising a number of major curved portions alternating with the same number of minor substantially straight portions, each curved portion having an inwardly curving shape, and each straight portion being equidistant from a central longitudinal axis of the shaped tube.

2. A shaped tube according to claim 1, in which the inwardly curving shape is symmetrical about a radius from the central longitudinal axis to a midpoint between two straight portions one either side of the curved portion.

3. A shaped tube according to claim 2, in which the inwardly curving shape is a semi-circle, a semi-ellipse, an arc of a circle or an arc of an ellipse.

4. A shaped tube according to any preceding claim, in which each curved portion has the same inwardly curving shape.

5. A shaped tube according to any preceding claim, in which each curved portion has the same separation from the central longitudinal axis.

6. A shaped tube according to any preceding claim, in which the number of curved portions is in the range of from two curved portions to twelve curved portions.

7. A shaped tube according to any preceding claim, in which the shaped tube is formed from a glass material or a polymer material.

8. A preform for an antiresonant hollow core optical fibre, comprising a shaped tube according to any one of claims 1 to 7 secured inside an outer jacket tube of glass material or polymer material such that the straight portions of the shaped tube are in contact or near-contact with an inner surface of the outer jacket tube.

9. A preform according to claim 8, further comprising at least one additional shaped tube in a nested arrangement with the said shaped tube, each of the shaped tubes having curved portions with a different inwardly curving shape and/or a different length

from the curved portions of the other shaped tube or tubes, and each of the shaped tubes having the same number of curved portions.

10. A cane for an antiresonant hollow core optical fibre drawn from a preform according to claim 8 or claim 9.

11. An antiresonant hollow core optical fibre drawn from a preform according to claim 8 or claim 9, or from a cane according to claim 10.

12. A method of fabricating a preform for an antiresonant hollow core optical fibre comprising:

providing a shaped tube according to any one of claims 1 to 7;

inserting the shaped tube into an outer jacket tube of glass material or polymer material such that there is contact or near-contact between the straight portions of the shaped tube and an inner surface of the outer jacket tube; and

securing the shaped tube inside the outer jacket tube.

13. A method according to claim 12, further comprising:

providing at least one additional shaped tube where each of the shaped tubes has curved portions with a different inwardly curving shape from the curved portions of the other shaped tubes or tubes, and the same number of curved portions; and

inserting the shaped tubes into one another to provide a nested group of shaped tubes inside the outer jacket tube.

14. A method of fabricating a cane for an antiresonant hollow core optical fibre, comprising fabricating a preform according to the method of claim 12 or claim 13, and drawing the preform into a cane.

15. A method of fabricating an antiresonant hollow core optical fibre, comprising fabricating a preform according to the method of claim 12 or claim 13 or fabricating a cane according to the method of claim 14, and drawing the preform or the cane into an optical fibre.

16. A method according to any one of claims 12 to 15, in which providing the shaped tube or tubes comprises fabricating the or each shaped tube by heating and reforming a

cylindrical glass tube over a former with an outer shape corresponding to the desired cross-sectional shape of the shaped tube.

17. A method according to any one of claims 12 to 15, in which providing the shaped tube or tubes comprises fabricating the or each shaped tube by depositing glass soot onto a rotating mandrel with an outer shape corresponding to the desired cross-sectional shape of the tube to form a shaped tube of glass soot, and sintering the shaped tube of glass soot to form a shaped tube of consolidated glass material.

18. A method according to any one of claims 12 to 15, in which providing the shaped tube or tubes comprises fabricating the or each shaped tube by extruding molten glass through a die shaped to correspond to the desired cross-sectional shape of the shaped tube.

19. A method according to any one of claims 12 to 15, in which providing the shaped tube or tubes comprises fabricating the or each shaped tube using three-dimensional printing.

~~20. A nested antiresonant nodeless hollow core optical fibre, or a preform or a cane for drawing into a nested antiresonant nodeless hollow core optical fibre, comprising:~~

~~a cylindrical elongate outer jacket of glass material or polymer material;~~

~~a cladding structure comprising a plurality of cladding elements of glass material or polymer material spaced apart around an inner surface of the outer jacket and defining elongate cladding voids, each cladding element comprising a first inwardly curving wall extending from the inner surface towards a central longitudinal axis of the outer jacket and back to the inner surface along a first curved shape, and a second inwardly curving wall extending from the inner surface towards the central longitudinal axis and back to the inner surface along a second curved shape which has a different shape and/or a different length from the first curved shape; and~~

~~an elongate hollow core region along the central longitudinal axis and bounded by negative curvatures of the first inwardly curving walls of the cladding elements.~~

~~21. An antiresonant hollow core optical fibre, a preform or a cane according to claim 20, in which each cladding element further comprises one or more additional inwardly curving walls extending from the inner surface towards the central longitudinal axis and~~

~~back to the inner surface along a curved shape different in shape and/or length from the first curved shape and the second curved shape.~~