WHAT IS CLAIMED IS:

1. A detector comprising:

a detector housing;

a scintillator material disposed within the detector housing;

a first compressive member disposed between the detector housing and the scintillator material at a first axial location, wherein the first axial location extends for a fraction of a total axial length of the detector housing and a fraction of a total axial length of the scintillator material, and wherein the first compressive member exerts a first compressive force around a peripheral side surface of the scintillator material at the first axial location; and

further comprising a second compressive member disposed between the detector housing and the scintillator material at a second axial location axially spaced apart from the first axial location, wherein the second axial location comprises a fraction of the total axial length of the detector housing and a fraction of the total axial length of the scintillator crystal.

2. A detector comprising:

a detector housing;

a scintillator material disposed within the detector housing; and

a first compressive member having a coiled construction and disposed between the detector housing and the scintillator material, wherein the first compressive member exerts a first radially compressive force around a peripheral side surface of the scintillator material.

3. A detector comprising:

a detector housing;

a scintillator material disposed within the detector housing; and

a first compressive member disposed between the detector housing and the scintillator material, wherein the first compressive member comprises a helically-shape body including a plurality of turns connected to each other and wrapping around a peripheral side surface of the scintillator material.

4. A detector comprising:

a detector housing;

a scintillator material disposed within the detector housing; and

a first compressive member disposed between the detector housing and the scintillator material at a first axial location occupying a fraction of a total length of the detector housing and a fraction of the total length of the scintillator material, wherein the first compressive member is disposed within a recess at the first axial location.

5. A detector comprising:

a detector housing;

a scintillator material disposed within the detector housing;

a first compressive member disposed between the detector housing and the scintillator material at a first axial location;

a second compressive member disposed between the detector housing and the scintillator material at a second axial location axially spaced apart from the first axial location along a length of the scintillator material; and

a spacer disposed between the first and second compressive members.

6. The detector of any of claims 2, 3, or 4, further comprising a second compressive member disposed between the detector housing and the scintillator material at a second axial location axially spaced apart from the first axial location, wherein the second axial location comprises a fraction of the total axial length of the detector housing and a fraction of the total axial length of the scintillator crystal.

7. The detector of claim 6, wherein the second compressive member exerts a second compressive force around the entire peripheral surface of the scintillator material at the second axial location.

8. The detector of claim 7, wherein the first compressive force is different than the second compressive force.

9. The detector of claim 8, wherein the first axial location is closer to a midpoint of the scintillator material as measured in the axial direction than the second axial location.

10. The detector of any of claims 1, 2, 3, or 5, wherein the first compressive member is disposed within a recess.

11. The detector of claim 10, wherein the recess is a groove extending circumferentially along an inner surface of the detector housing.

12. The detector of claim 10, wherein the recess is a groove extending circumferentially along a peripheral side surface of the scintillator material.

13. The detector of claim 10, wherein the recess is a groove extending circumferentially along a surface of a sleeve, wherein the sleeve overlies the peripheral side surface of the scintillator material.

14. The detector of any of claims 1, 2, 3, 4, or 5, wherein the first compressive member comprises a helically-shaped body, and wherein the helically-shaped body extends circumferentially along a peripheral side surface of the scintillator material and further extends axially along a length of the scintillator material.

15. The detector of claim 14, wherein the helically-shaped body further comprises a second pitch different than the first pitch, wherein the helically-shaped body exerts a first radially compressive force on the scintillator material along a first region having the first pitch and a second radially compressive force on the scintillator material at a second region having the second pitch.

CLAIMS:

1. A detector comprising:
   a detector housing;
   a scintillator material disposed within the detector housing;
   a first compressive member disposed between the detector housing and the scintillator material at a first axial location, wherein the first axial location extends for a fraction of a total axial length of the detector housing and a fraction of a total axial length of the scintillator material, and wherein the first compressive member comprises a metal or a metal alloy material and exerts a first compressive force around a peripheral side surface of the scintillator material at the first axial location; and
   further comprising a second compressive member disposed between the detector housing and the scintillator material at a second axial location axially spaced apart from the first axial location, wherein the second axial location comprises a fraction of the total axial length of the detector housing and a fraction of the total axial length of the scintillator crystal.

2. A detector comprising:
   a detector housing;
   a scintillator material disposed within the detector housing; and
   a first compressive member having a coiled construction and disposed between the detector housing and the scintillator material, wherein the first compressive member comprises a metal or a metal alloy material and exerts a first radially compressive force around a peripheral side surface of the scintillator material.

3. A detector comprising:
   a detector housing;
   a scintillator material disposed within the detector housing; and
   a first compressive member disposed between the detector housing and the scintillator material, wherein the first compressive member comprises a helically-shape body including a plurality of turns connected to each other and wrapping around a peripheral

side surface of the scintillator material, and wherein the first compressive member comprises a metal or a metal or a metal alloy material.

4. A detector comprising:
a detector housing;
a scintillator material disposed within the detector housing; and
a first compressive member comprising a metal or a metal alloy material and disposed between the detector housing and the scintillator material at a first axial location occupying a fraction of a total length of the detector housing and a fraction of the total length of the scintillator material, wherein the first compressive member is disposed within a recess at the first axial location.

5. A detector comprising:
a detector housing;
a scintillator material disposed within the detector housing;
a first compressive member comprising a metal or a metal alloy material and disposed between the detector housing and the scintillator material at a first axial location;
a second compressive member disposed between the detector housing and the scintillator material at a second axial location axially spaced apart from the first axial location along a length of the scintillator material; and
a spacer disposed between the first and second compressive members.

6. The detector of any of claims 2, 3, or 4, further comprising a second compressive member disposed between the detector housing and the scintillator material at a second axial location axially spaced apart from the first axial location, wherein the second axial location comprises a fraction of the total axial length of the detector housing and a fraction of the total axial length of the scintillator crystal.

7. The detector of claim 6, wherein the second compressive member exerts a second compressive force around the entire peripheral surface of the scintillator material at the second axial location.

8. The detector of claim 7, wherein the first compressive force is different than the second compressive force.

9. The detector of claim 8, wherein the first axial location is closer to a midpoint of the scintillator material as measured in the axial direction than the second axial location.

10. The detector of any of claims 1, 2, 3, or 5, wherein the first compressive member is disposed within a recess.

11. The detector of claim 10, wherein the recess is a groove extending circumferentially along an inner surface of the detector housing.

12. The detector of claim 10, wherein the recess is a groove extending circumferentially along a peripheral side surface of the scintillator material.

13. The detector of claim 10, wherein the recess is a groove extending circumferentially along a surface of a sleeve, wherein the sleeve overlies the peripheral side surface of the scintillator material.

14. The detector of any of claims 1, 2, 3, 4, or 5, wherein the first compressive member comprises a helically-shaped body, and wherein the helically-shaped body extends circumferentially along a peripheral side surface of the scintillator material and further extends axially along a length of the scintillator material.

15. The detector of claim 14, wherein the helically-shaped body further comprises a second pitch different than the first pitch, wherein the helically-shaped body exerts a first radially compressive force on the scintillator material along a first region having the first pitch and a second radially compressive force on the scintillator material at a second region having the second pitch.