```
trials = 4000;
n1 = ConstantArray[0, trials]; (*container for n1*)
Do[q = RandomPoint[Sphere[4]];  (*uniform random points of a 4 dimensional sphere*)
 w = q[[1]];  (*extracts the first coordinate of q*)
 x = q[[2]];  (*etc.*)
 y = q[[3]];
 z = q[[4]];
 n = {0, 2 w * y + 2 x * z, 2 y * z - 2 w * x, w^2 + z^2 - x^2 - y^2};  (*Niles Johnson's coordinate translation from quaternion math*)
 n1[[j]] = {n[[2]], n[[3]], n[[4]]},  (*extracts the x, y and z coordinates from n; the first coordinate is zero*)
 {j, trials}] (*run the loop for that many trials*)
Graphics3D[Table[Point[{{0, 0, 0}, p}], {p, n1}]] (*plots n1 in 3D*)
```

Out[7]=