Keystone: Chapter 11

Buckminsterfullerene, C_{60} , is a large molecule consisting of sixty carbon atoms connected to form a hollow sphere. The diameter of a C_{60} molecule is about 7e-10 m. It has been hypothesized that C_{60} molecules might e found in clouds of interstellar dust, which often contain interesting chemical compounds. The temperature of an interstellar dust cloud may be very low, around 3K. Suppose you are planning to try to detect the presence of C_{60} in such a cold dust cloud by detecting photons emitted when molecules undergo transitions from one rotational energy state to another.

Approximately, what is the highest-numbered rotational level from which you would expect to observe emissions? Rotational levels are l = 0, 1, 2, 3, ...