

### Answer on Question #74740, Physics / Quantum Mechanics |

Determine the commutator  $L_z L_y$ .

**Solution:**

$$\begin{aligned}[L_z, L_y] &= [x p_y - y p_x, z p_x - x p_z] = [x p_y, z p_x] - [x p_y, x p_z] - [y p_x, z p_x] + [y p_x, x p_z] \\ &= z p_x [x, p_x] - 0 - 0 + y p_z [p_x, x]\end{aligned}$$

Remembering that  $[x, p_x] = -[p_x, x] = i\hbar$ , we obtain

$$[L_z, L_y] = i\hbar(z p_x - y p_z) = -i\hbar L_x$$

**Answer:**  $[L_z, L_y] = -i\hbar L_x$

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