The commutator subgroup of the alternating group A_4 is the Klein group V_4. This is normal in A_4 because it is so in S_4. Moreover, on the one hand, the quotient A_4 / V_4 is commutative, because it is order 3, on the other hand, if H is a proper subgroup of A_4, then

- if H is trivial, $A_4 / H \simeq A_4$ is not commutative;
- if H is non trivial, then it is not a normal subgroup: in this case H has order $2,$ its elements are id and, with loss of generality, the permutation $(1,2)(3,4),$ whereas its conjugate

$$(1,2,3)(1,2)(3,4)(1,3,2) = (1,4)(2,3)$$

  does not belong to H.