Tutorial problems (23750) for "Solar Energy" lecture (23745), WS 2014/2015
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Tutorial Questions #5:

1. **3rd Generation Photovoltaics**

   Define 3rd generation photovoltaics. Why are OPV and a-Si cells not 3rd gen PV?

2. **Efficiency calculations**

   a) How do the Landsberg efficiency and the Carnot efficiency define the total efficiency of a solar cell? What is the Shockley-Queisser efficiency limit?

   b) Calculate the limiting efficiency for the non-reciprocal system of the below figure when only one circulator and two black-body absorbers are used. Assume the sun's temperature is 6000 K and the ambient temperature is 290 K.
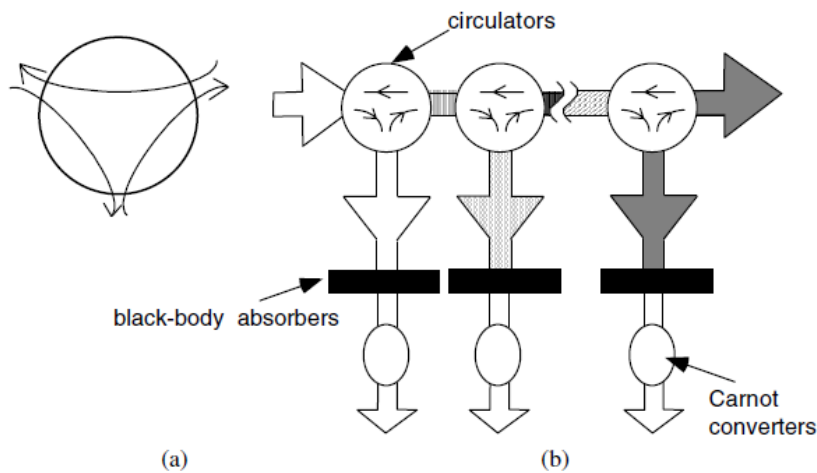

Fig. 3.7: (a) Circulator. (b) Non-reciprocal converter based on circulators.

3. **Tandem Solar Cells**

   a) What is the strategy behind tandem solar cells?

   b) Explain the challenge in current mismatch in tandem cells?