```
Tr [Haree dag]
= Tr [(\sum_{1} \frac{1}{2} \frac{1}{2} \widetilde{\pi} \widetilde{\pi} \frac{1}{2} \left[ n (\widetilde{\pi} \text{Th}) + 1] \cdot (2 \delta_{13} 9 \delta_{13}^{\dagger} - \delta_{13}^{\dagger} \delta_{13} \delta_{13} 9 - 9 \delta_{13}^{\dagger} \delta_{13} \delta_{13}
         + 5h [n(with) (2 531 · 8531 - 531 5319 - 8531 531))
    = Tr [ to wh 8th (n(wh, Th)+1) (13><31 2 813 g 813+-13><31 813 8-13><31 8813 613 9
   + Tr [ twc 3th (n(wh, Th)+1) (11)<112 813 9 813+-11><11 813 8-11>(1188+3813)
      + Tr [ two 8th n(wh, Th) (11><112 531 g 531-11><11 531 531 g - 11><11 g 531 531)
     + Tr[tw212>(21. Lhg] = 0
      + Tr [ twaa . Lhg] = 0 // Kommutiert
           = \operatorname{Tr} \left[ \frac{13}{3} \times \frac{3}{3} \times \frac{1}{4} \times \frac{3}{3} \times \frac{1}{2} \times \frac{9}{3} \times \frac{
              + Tr[twh 1/2 h(wh, Th). (213><313><11851) = 1 (2.531851)=+P1
            + Tr [ + wc = n(w4, 7h)+1). 11><11(2. 813 9 813) = 2/1><1/31813>/1=+1/3
              + Tr [ hwc 5 n (wh,76) . 1-11)(+1 531 531 8-11)(118 531 531 =-2P1
                              -13><319013 013 = 913><11/11><0/11><0/11>
                         = -\hbar\omega h \, \chi h \cdot n(\omega h, Th) + 1) \, P_3  } = -\hbar\omega_h \, \chi_h \, P_3
                            + towh yh.n (wh, Th) P3
                           + touc y h. (h (wh, Th)+1) P1 } = + to wc yh P1
                          - two y h. (n(wh, Th) P2
```

= tyh. (waP1 - wh P3)

Tr [Haree · dcav g]

= (\begin{align\*} 2 \text{ hwiliscil} + \text{ hw ala}) \cdot [k(\bar{n}+1) \cdot(2 \text{ aga} - a^{\text{ ag}} - ga^{\text{ al}})] \\
+ (\begin{align\*} 2 \text{ hwiliscil} + \text{ hw ala}) \cdot [k \bar{n} \cdot(2 \text{ aga} - a \text{ ag} - ga \text{ al}]] \\
= \text{Tr [\text{ hwk (n+1)} [2a^{\text{ aaga}} - a^{\text{ aaga}} - a^{\text{ aaga}} - a^{\text{ agaa}} - a^{\text{ agaa}} \text{ agaa} \text{ ]} \\
+ \text{ hwkn [2 a^{\text{ aa}} a a^{\text{ ag}} - a^{\text{ aagaa}} - a^{\text{ agaa}} \text{ agaa} \text{ ]} \\
= \text{ hwk (n+1) [2 \text{ Tr a^{\text{ a}} a^{\text{ aaga}} - a^{\text{ aagaa}} \text{ agaa} \text{ ]} \\
+ \text{ hwk (n+1) [2 \text{ Tr a^{\text{ aa}} a a \text{ ag}] - \text{ Tr [a^{\text{ aa}} a \text{ ag}] - \text{ Tr [a^{\text{ aa}} a^{\text{ ag}]} - \text{ Tr [a^{\text{ aa}} a \text{ ag}] \\
+ \text{ hwk (n+1) \cdot Tr [a^{\text{ aa}} a \text{ aafg}] + \text{ Tr [a^{\text{ aa}} a \text{ ag}] - \text{ Tr [a^{\text{ aa}} a \text{ ag}] \\
+ \text{ hwk (n+1) 2 \text{ Tr [a^{\text{ aa}} ag] + \text{ Tr [a^{\text{ aa}} a \text{ ag}] - \text{ Tr [a^{\text{ aa}} a \text{ ag}] \\
+ \text{ hwk (n+1) 2 \text{ Tr [a^{\text{ aa}} ag] + \text{ Tr [a^{\text{ aa}} ag] \\
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- \text{ hwkn 2 \text{ Tr [a^{\text{ aa}} ag] - \text{ Tr [a^{\text{